This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.

+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.

+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.

+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`

VOLUME III

770
P563
3

APRIL, 1901—MARCH, 1902

The Photo-miniature

~~FA 6615.455~~

TRANSFERRED TO
FINE ARTS LIBRARY

HARVARD COLLEGE
LIBRARY

IN MEMORY OF
FRANKLIN TEMPLE INGRAHAM
CLASS OF 1914

SECOND LIEUTENANT
COAST ARTILLERY CORPS
UNITED STATES ARMY

WELLESLEY, MASSACHUSETTS
MAY 23, 1891 APRIL 11, 1918

TIFFANY & CO.

E 2. 2.

THE PHOTO-MINIATURE

: : A MONTHLY MAGAZINE OF : :
PHOTOGRAPHIC INFORMATION
: EDITED BY JOHN A. TENNANT :

VOLUME III

770
P563
3

APRIL, 1901—MARCH, 1902

NEW YORK
TENNANT AND WARD

LONDON
DAWBARN & WARD, LTD.

~~FA 6616.455~~

✓

FA 16.107

HARVARD FINE ARTS LIBRARY
FOGG MUSEUM

HARVARD COLLEGE LIBRARY

COPYRIGHTED, 1901 AND 1902
BY TENNANT AND WARD
NEW YORK

Mount Pleasant Press
J. Horace McFarland Company
Harrisburg, Pennsylvania

MONOGRAPHS

		Pages
25.	LANDSCAPE PHOTOGRAPHY	1– 36
26.	TELEPHOTOGRAPHY	49– 84
27.	PINHOLE PHOTOGRAPHY	97–138
28.	SEASHORE PHOTOGRAPHY	151–177
29.	FLASHLIGHT PHOTOGRAPHY	191–225
30.	PHOTOGRAPHING INTERIORS	239–276
31.	PHOTOGRAPHING AT NIGHT	291–329
32.	DEFECTS IN NEGATIVES	343–378
33.	THE DARK-ROOM	391–424
34.	MORE ABOUT DEVELOPMENT	439–473
35.	ENLARGING NEGATIVES	487–522
36.	LENS FACTS AND HELPS	535–567

ILLUSTRATORS

	Facing or following page
Abbott, Yarnall	503
Adamson, Prescott	302
Baker, F. C.	9, 109
Bartlett, George D.	562
Barstow, R. S.	25
Bartram, Howard P.	459, 467
Beasley, H. A.	24
Beckley, O. P.	8
Boissonnas, Fred.	77
Brown, R. D.	402
Burke, Walter	343, 350, 351, 354, 370, 371
Coburn, Alvin Langdon	535, 550

	Facing or following page
Collaco, J. R.	418,419
Collins, F. H.	399
Davison, E. J.	398
Denton, Frank J.	355
Dobbins, Frank S.	49, 57, 59, 60, 61, 76
Falk, B. J.	262
Firmin, George D.	16, 151, 158, 159, 166, 167, 174, 175
Hall, Henry	554
Heyl, Chas. C.	294
Hines, Percy Rapier	310, 318, 319
Hodges, Frederick B.	507
Holm, Sara W.	403
Ingram. W. H.	12
Kimball, W. G. C.	458
Langill, C. C.	246
LaFarge, C. Grant	4, 13
McCorkle, James H.	291, 306, 406, 555, 563
Mellen, George E.	247, 263
Motteran, W. C.	294, 307
Morgan, F. W.	255
Nicholson, J. Whitall	1
Pach Bros.	254
Pohle, F. W. C.	502, 514–515
Rudolph, Dr. Paul	56
Ryan, M. J.	310, 311, 314, 315
Shutt, Frank T.	28
Stanbery, Katharine S.	487, 551
Thomson, J. B.	97, 104, 105, 108, 116, 117, 124, 125
Troth, Henry	4, 5, 29, 439, 454, 455
Ward, Catharine Weed Barnes	239
Waters, E. D.	191, 198, 199, 206, 207, 214, 215, 218, 219
Waugh, F. A.	17, 391
Wenzel, Henry, Jr.	506
Whyte, R. B.	4
Yellott, Osborne I.	295, 303

INDEX

Acetone sulphite, 576.
Adon Lens System, 581.
Amateurs in America, 86.
Apochromat Collinears, 232.

Bromide prints toned with copper, 143.

Camera Club, N. Y., Library of, 90.
C. P., its meaning, 141.
Composition, 142, 3-34.
Copper toning of bromide prints, 143.
Cramer's ortol formula, 147.
Color photography, 147, 530, 534.
Copyright, 179.
Chicago Salon, 277, 279.
Circulating Library, Photographic, 278.
Coloring lantern-slides, 338.
Carbutt's film sheaths, 337.
Carbon prints with matt finish, 529.

Dark-Room, The — Argument, 391; light, 392; from window or lamp, 393; bichromate lamp, 394; construction of a window, 395; its non-actinic covering, 396; testing the light, 396; water supply, 397; home-made appliances, 398. Ventilation, 399; the door, 400; size of room, 401; diagram and description, 402, 403; shelves and hooks, 403; vestibule to the room, 406; variations in arrangement, 406; other room advisable, 407; various limitations, 408, 409; substitutes and makeshifts, 409–412; folding cabinets and sinks, 413; portable dark-rooms, 414–416. Changing plates in room, 416; changing bags, 417; makeshifts, 418. Apparatus, 419; trays, 420; fixing baths, 421; washing boxes, 421; graduates, 421; bottles, 422; compounding formulæ, 423; final caution, 423. *Books*, 424.
Defects in Negatives — Argument, 343; cause of defects, 345; the perfect negative, 345; chemical fog, 346; temperature, 346; excess of alkali, 347: caustic alkalies, 348; defects in development, 348; dichroic fog, 349; iridescence: metallic luster, 349; light fog, 350. In the dark room: unsafe light, 350; undue exposure to light, 351; outside light entering, 351, 352. In the field or studio: friction of vulcanite slides, 352; defective bellows or lens mount, 353; plate-holders, 353; improperly inserting slides, 354; exposure of plate-holders to sunlight, 355; pinholes, 355; air-bubbles, 357; various spots, 357, 358; mottled appearances, 359; leathery film, 360; fungoid growths, 361; comet marks, 361; parallel lines, 361; transparent lines, 362; "frosty" crystals on film, 362; why we develop, 362; frilling, 363; blisters, 365; coarse-grained negatives, 366; uneven patches or streaks, 336; printed matter on films; insensitive or opaque bands, 367; string markings, 367; absence of image, 367. Stains: sulphite stains, 368, 369; pyro, 370; amidol, hydroquinone, and silver stains, 371; blue print, platinum, and persulphate stains, 372. Scratches, 373, 374; scratches on the glass, 376. *Books*, 378.
Developing Hints, 228.
Development of print-out papers, 229.
Depth of definition with hand-cameras, 288.
Draper, Death of Miss Dorothy, 379, 526.
Development: with pyro, metol, and ortol — Introduction and acknowledgment, 439, 440; preliminaries, 440; how to value a negative, 441; essentials in negative-making, 441; latitude of exposure, 442; controlling results, 443; choice of a developer, 444; the developers discussed, 445. *Pyro*, 445; as a developer, 446; its disadvantages, 447. pure water, 448; constituents of a developer, 449; amount of pyro and alkali, 450; sodium sulphite, 450; potassium bromide, 451; preservatives, 452; how to develop, 452; Watkins' system: factorial development, 453; procedure, 453; example, 454; suggested factors, 454; their use, 455; eikronometer, 455; varying the factor, 456; a formula, 457; dry pyro developer, 457; usual way of developing, 458; over-exposure, 459; under-exposure, 460; very brief exposures, 461; slow development, 461; white draperies, 461; stainless developers, 462; other formulæ, 463, 464. *Metol:* formulæ and directions, 464; hypo in developer, 464; potassium bromide, 465; comparative value of metol, 465; fixing, 466; Watkins'

system, 466; under-exposures, 467; normal exposures, 467; over-exposures, 468; development of positives, 468; metol-hydroquinone, 468; its use, 468; Nepera "M. Q.," 469; comparative value of metol-hydro, 469; metol-pyro, 470; comparative value, 471. *Ortol:* formulæ, 471, 472; comparative value, 472; ortol-metol, 472. *Books*, 473.
Dobbins' Exposure Tables, 568.

Enlarging Negatives: Small cameras, 468; the negative and its purpose, 491; enlarging without apparatus, 492; Lurcock's method, 496; Vogel's method for films, 497; negatives for enlarging, 499; exposure, 499; development, 500; the transparency, 501; contact transparencies, 501; carbon transparencies, 503; improving the transparency, 505; a simple enlarging box, 506; enlarging tables, 508; daylight enlarging, 509; the enlarging room, 510; enlarging with artificial light; the illuminant and light box, 515; condensers, 510; focusing, 519; the exposure, 526; making enlarged positives, 521; enlarging from large negatives, 522.
Education, Photography in, 479.
Exposure Tables, 568.

Flashlight Photography — Introduction, 191; history and evolution, 192, 193; flashlight compounds, 194. Quality of work, 195; causes of failure, 195, 196; need for thoroughness, 197. Apparatus, 198; lenses, 198; cameras, 199; tripod, 199. Plates and backing, 200; developer formula, 201. The lamp, 202; simplest forms, 202; hand-lamps, 203; stand-lamps, 204. Flash powders: magnesium, 205; compounds, 206; danger in use, 206; charging the lamp, 207. Practical work: Thayer's lamp, 208; method of igniting flash, 208; lighting a bust, 209; diagrams, 210–212; Rembrandt lighting, 211; shadow lighting, 212. Large groups, 213; small "at home" groups, 215. Bold lighting, 216. Photographing a baby, 217; animals, 214; silhouettes, 217, 218; figures in doorways, 218; fireside and window pictures, 218, 219. Powder measure, 219. Method of development, 219; examples, 220–222. Backgrounds, 222; height of the lens, 222, handling the sitter, 223; need for retouching, 224. Care of apparatus, 224. Acknowledgment, 224. *Books*, 225.

Focusing interiors, 145.
Fishes, Photographing, 179, 340.
Flowers, Photographing, 186.
Fuchsine, 233.
Figure in motion, Photographs of, 237.
Focusing finder, 279.
Freak photography, 428.
Fluid lens (See Grun).
First photographic portrait, 379, 526.
Film sheath, Carbutt's, 387.

Gennert, Gottlieb, 39.
Goerz lens, A new, 581.
Grun's fluid lens, 290, 432.
Gum-bichromate printing, 88, 140, 575.

Harvard Camera Club, 47.
Hocheimer's gum-bichromate paper, 88
Hydroquinone, 230.

Interiors, Photographing—Argument, 239. Picture material, 241; classes, 242. The camera, 242; focusing, 243; swing-back, 243; adapting cameras, 244; tripods, 244. Lenses, 245; angles of view, 245: angle affected by size of plate, 247; the wide-angle lens, 247; perspective, 249; choosing a lens, 249. Halation, 250; non-halation mixtures, 251; backing plates, 252; backed and non-halation plates, 252. Home interiors: illumination, 253; a simple actinometer, 254; and its use, 255; exposure meters, 256; sufficient exposure, 257; inequality of illumination, 257; controlling it, 258; local lighting, 259; choice of point of view, 259; arrangement of interior, 260; reflections, 261; focusing, 145, 261; by table, 262; interiors by gaslight, 264; by flashlight and daylight combined, 264. A diffusing screen outfit, 265; materials required, 266; mounting the screens, 267; the reflector, 267; putting the apparatus together, 268; adjusting the lamp or lamps, 268, 269; twin-lamp attachment, 269; using the apparatus. Amount of powder, 271; interior and exterior combined, 272; church interiors, 273, 274. Development, 275. *Books*, 276.
Insurance, Photography used in, 46.
Instantaneous work, 579.

Japanese coloring method, 338.

Landscape Photography — Introduction and argument, 1. Failures from ignorance, 3. Selection of subject, 4. Variety, 5. Reflection of personality, 6. Carefulness, 8. Composition, 9. The sky-line, 10. Masses, 11. Light and shade, 11. Lines, 12. Foreground, 13. Distances, 14. Center of interest, 14. Lighting, 15. Shadows, 16. Developing for shadows, 17. Atmosphere, 17; methods of obtaining, 18; by printing, 20. "Compensating negatives," 21. Clouds, 22. Moonlight and other effects, 23. Special lines of work, 24. Cameras, 25. Lenses, 25. Films and plates, 27. The best plates, 28. Plate backing, 29. Exposure meters, 29. Various developers, 31; and printing processes, 32, 34. Blue prints, 33. Prints for exhibitions, 34. *Books*, 35.

Lantern-slides, Coloring, 338.

Lens, A shade for, 44.

Lens Facts and Helps — Introduction, 535; definition, 536; circles of confusion, 536; parallel rays, focal length and focal power, focal length for parallel rays, 537. Nodal or Gauss points, nodes of admission and divergence, properties of the nodal points, 538; modern definition of focal length, equivalent focal length, normal and crossed nodal points, 539. Law of Conjugate foci, calculating conjugates, 540. Arithmetic of copying and enlarging, 541; angle of view, diaphragm, when F numbers mislead, 542; F numbers of single lenses, 543; non-achromatic lenses, 544; combining lenses, the rule in combining, getting a lens, 545; lenses for choice, 546; spectacle lenses, caskets or sets, 547; achromatic single lens, rapid rectilinears, 548; wide-angle lenses, anastigmats, 549; choosing an anastigmat, rapidity, 550; separability, 551; later anastigmats, 551; choice of focal length, what focal length does, what viewpoint does, 553; explanation of perspective 554; portrait lenses, stigmatic portrait lens, 556; Dallmeyer-Bergheim lens, 557; focal length and the studio, 557; how to focus, 558; focusing screens, 558; focusing by scale, lens and camera, 559; remedying distortion, clean lenses, 560; reflected light, separating lenses, 561; testing, finding focal length, 562; Schrœder, Chapman-Jones method, 563; the nodal point, spherical aberration, astigmatism, curvature of field and chromatism, 564; the pass-test for anastigmats, 565; angle of illumination, 567. *Books*, 567.

Lenses for studio use, 236.

London Salon, 285, 335.

Lurcock's enlarging method, 496.

Metol, development with, 464.

McGinnis exposure method, 482.

Night, Photography at — Argument, 291. Sources of light at night, 293; what to photograph, 294; requirements of a night picture, 296. Apparatus, 295; a new lens, 295; other needs, 296. Patience, 296; fake moonlights, 297; the lens required, 298; "working in" a moon, 298, 299; an exposure table, 299; exposure, 300; true moonlights, 300; exposure, 301. Camera support, 302. Composition, 303. Photographs of the moon, 303; of star trails, 304; of lightning, 305. Procedure for obtaining lightning records, 306; a note on storms, 308. Natural gas illumination, 309; street scenes, 310; history and hints, 311–313; "ghosts," 313; park scenes, 314; electric fountains, 315; lens and plate notes, 316; halation, 317; backing plates, 318. Snow pictures, 319. Welsbach lights, their use in the darkroom, 320; acetylene, 322; fireworks, 323; interiors, 323; by electric light, 324; show windows, 325. A developer, 326; development, 326; printing methods, 328. *Books*, 329.

Nature, An appreciation of, 41.

Negative paper, 332.

Ortol, Development with, 147, 233, 471.

Ohio in photography, 38.

Ozotype, 44, 92, 227, 572.

Orthochromatic plates, 144.

Pinhole Photography — History, 97; and acknowledgment, 98. Argument, 99; advantage in truthfulness, 99; focusing unnecessary, range of angle of view, equality of effect, etc., 100. Definition, 101. Pictorial truthfulness, 102. Cheapness, 102. Apparatus, 103; may be home-made, 104; the camera, 104; shutters, 105, 107. The needle hole, 108; its essentials, 108; thickness of metal and reflections, 109, 110; the best metal, 111; to pierce the hole, 112; to dull its edges, 113; fixing the plate, 113. A finder, 114. Stereoscopic and panoramic accessories, 114, 115. Principles, 115; of apertures, 115; modifying circumstances, 116; width of aperture, 117; the needle to be chosen, 118. Focus, 118; disagreement of experts, 119; latitude of focus, 120; influence of view angle, 121; a rule, 122, 123. Exposure, 123; comparative rapidity,

123; a system, 124; tables, 125; examples in their use, 126. Practical work, 127; landscape, 127; architecture, 129; high towers, 131; statuary, etc., 132; portraiture, 132; copying, 133; stereoscopy, 134; panoramas, 135. Effect of sunlight and wind, 128, 129. Magazine camera, 129. New name suggested, 137, 234. *Books*, 138.
Pyro, Development with, 439-473.
Paris, Photo Club of, 39.
Paris exposition, Photographs at the, 87.
Photo Dealers' Annual, 90.
Paris Salon, 92, 523.
Press, Photography for the, 149.
Philadelphia Salon, 182, 330.
P. A. of A. convention, 226.
Print-out papers, Developing, 229.
Papers for mounting purposes, 380.
Photo Secessionists' Exhibition, 523, 569.

Robinson's pictures, H. P., 141.
Rights in one's portrait, 183.
R. P. S. Exhibition, 334.

Seashore Photography — Argument, 151; special conditions, 152. Cameras, 152; for pictorial work, 153. Lenses, 154; shutters, 154, 158; focusing cloth, 155; strong tripod required, 155; tripod stay, 156; working in water, 157. Levels, 156; finders, 157; color screens, 157; stops, 158. Plates and films, 158, 159. Action of moisture or sand on plates, etc., 159. Exposure, 160; meters, 161; suggested exposures, 161. Subjects: sea and sky, 161; clouds, 162; printing-in of clouds, 163; sea, 163; surf, 164; sunsets and effects, 165. Halation, 166. Boats and shipping, 166; their lighting, 166; and composition, 167. Horizon line, 168. Composition, 168. Beach pictures, 168; flotsam foregrounds, 169; beach from the sea, 170. Figures: beach groups, 171; children, 171; fisher- and life-boatmen, 172. Marsh meadows, 173; waterways, 173; usually worked from a boat, 174; sand-dunes, 174; trees, 174. Development, 175; a formula, 177; to prevent films curling, 176.
Sampolo-Brasseur color process, 147.
San Francisco Salon, 281.
Silver phosphate papers, 578.
Speed list of American plates, 474.
Suter anastigmat, 89.

Telephotography — Argument, 49; history, 49; a definition, 50. The telephotographic lens, 51. Focal length, 51; size of image, 51; how to vary it, 52. Correct "drawing," 52. Length of focus and camera extension, 53. Principles, 53; optical center of a lens, 54; its displacement, 54. Positive and negative lenses, 55. Telephoto combination, 56; "attachments," 57, 58. The camera, 59; table of camera extension required, 60. To find magnification, 60; practical suggestions, 60. Tripod, 61. Small cost, 63. Advantages: distance photography, 64; better perspective, 66; architecture, 66; portraiture, 67; nature study, 68. Disadvantages: longer exposure, 68; wind, 69; atmospheric disturbances, 70; perspective of buildings, 71; bulk, 71. Advantages of hand-cameras, 72. Plates, 73. Actual working, 73, 74. Moderate magnification best, 75. Exposure, 69, 75; meters, 75; tables, 76, 79; use of tables, 77, 80. Rule for calculating comparative focal lengths, 78. Telephotography at short distances: architecture, 81; portraiture and groups, 83. Influence of color, 81. Tilting board, or two tripods, 81, 82. Advantage over enlargements, 82. Little use in astronomy, 83. A new lens, 84. *Books*, 84.
Telephotography, A new use for, 287.
Trees, Photographing, 39.

Waugh, F. A., 40.
Wager's exposure scale, 227.
Wink, photographing a, 333.
Watkins' system in development, 381.

Verrill's color process, 530.

X-rays, 43.

6-59

Plat. 4 x 6

J. Whitall & Nicholson

The Photo-Miniature

A Magazine of Photographic Information

EDITED BY JOHN A. TENNANT

Volume III APRIL, 1901 Number 25

LANDSCAPE PHOTOGRAPHY

There are many books on landscape photography, but is an inexhaustible theme and we cannot know too uch about it. More especially do we need a little ook which will discuss landscape photography with the readth and directness characteristic of the amateur hotography of today. In this view of the subject, to e sure, there may be less of the spirit of the masters in rt of past years than we find in the earlier text-books, ut the living touch of today's thought will abundantly ompensate for that. The warm welcome given to the onograph on *Gum-bichromate Printing*, written by Mr. . A. Waugh, led me to believe that Mr. Waugh could ive us something equally acceptable concerning the rger field of landscape photography. Accepting the roposition, Mr. Waugh tells us in the following pages hat experience has taught him during his field excurions with and without a camera. There is, of course, o finality in this or any other phase of art. What Mr. Vaugh gives herein are individual impressions and peronal experiences, with which we may or may not agree, ccording to our own notions. But I am sure that the eader will agree with me that, for the most part, Mr. Vaugh teaches wisely, and that his little book is a helpul contribution to the literature of the subject.

EDITOR.

The beginner always buys a hand-camera and starts fe photographically by "snapping" the shutter and tting some one else "do the rest." Two classes of ubjects attract him about equally. The first is his elatives standing in a row on the lawn and shading their eyes from the glaring sun. The other is the open landscape.

As he grows older in the work the novice tires of photographing his friends and relatives, and is apt to give up this line of effort entirely until the time when he comes back full of experience to a serious study of portraiture. But landscape photography is never abandoned, unless the man comes eventually to be a hopeless professional and a specialist. The photographic study of landscape remains the chief source of the ordinary amateur's enjoyment as well as the means of his education, and the fascination of it does not pall on the most expert and sophisticated camera man. There is certainly no class of photographic work, outside of professional portraiture, which consumes so many plates as this, and there we have reason enough, without going further, why one number of The Photo-Miniature should be occupied with a discussion of some of the more neglected phases of this work.

Apart from its pleasures, there are a great many technical or semi-technical uses to which a knowledge of landscape photography may be put. The railway engineer in making a survey of a new route finds his camera the best accessory of his note-book. The geologist and mining expert makes views of mountain ranges and outcropping ledges. The geographer wants photographs of all the places he explores. The architect uses one adaptation of landscape photography when he makes views of the outsides of his houses. The lawyer uses the camera in collecting evidence, and finds a lot of pictures very entertaining and convincing to a jury. The horseman wants pictures of his trotters on the track and the cattleman of his herd at pasture and the sheepman of his flock in the fold. I have also seen good and useful photographs of pure-bred swine, subjects which can be managed out of doors much better than in a studio. All the leading nurserymen in this country now illustrate their catalogues with photographs of bearing orchards, growing nurseries, packing houses and shipping scenes. It is evident that good work in any of these lines depends on an understanding of the same general principles which underlie all the subject of landscape study; and the enormous extent and variety of these technical uses of photography may well excuse their consideration here.

The Line of Treatment

Some of the unsatisfactory work in photographing landscapes is obviously due to ignorance of ordinary manipulations—of exposure, development and printing. Some of these subjects have been treated in special numbers of THE PHOTO-MINIATURE; others will be. The difficulties peculiar to landscape photography occur chiefly in the understanding of the landscape itself. The photographer fails to see the essential elements of the view, or fails to differentiate them from the non-essential; or, having seen something really good, comes short of success in the interpretation of what he sees. Usually the gratifying impression in his own mind is not adequately analyzed—he has a good idea, but it does not crystallize into form. In other cases only a half success is reached because the worker does not have command of his medium of expression—to use an artist's pretentious phrase—because he has studied photography as a means of recording *facts*, not as a means of expressing *ideas*. The expression of ideas I take to be the test of pictorial photography, so called (though one should never forget that ideas may be worse than facts, as well as better!).

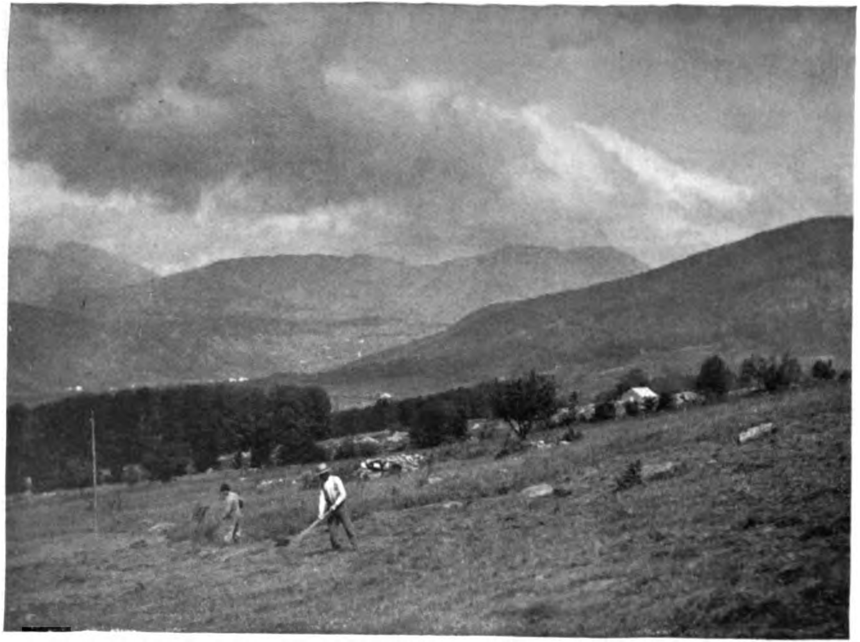
Just here a personal reference may make clearer the standpoint from which this essay is written. I trust I may be forgiven the indelicacy. The fact is that I studied this subject first, not as a photographer, but as a landscape gardener. I was trying to put landscapes together out of such various materials as came to hand, to make real live landscapes of fences, trees and blue grass. To make the matter as bad as possible I wrote a book on the subject, in which I discovered that the fundamental tests of such a hand-made landscape are five: (1) unity, (2) variety, (3) character, (4) propriety, and (5) finish. It seems to me that these same tests, in a somewhat different way, ought to govern one in making a landscape picture in platinum, carbon, gum or cyanotype, just as they ought to direct the landscape gardener. At any rate we shall now take a look at these principles and see how they apply to pictorial photography out-of-doors.

Unity

A friend of mine once said she would like to have me come to her summer home and make a photograph of the view from the front piazza. She said it was magnificent. To begin with, there were the lawn and flower beds, with the country road beyond. There was a meadow beyond the road, and then a thin grove of trees, through which the lake was visible for five or six miles; and beyond the lake were the mountains. Lawn, flower beds, country road, meadow, forest, six miles of lake and a range of mountains! Rather a large order for a 5 x 7 plate! Yet this sort of thing is repeatedly attempted by the beginner, who sometimes tries to put a sunset on top of it.

Now it is difficult to put *one* thing into a photograph well; more than one thing should never be attempted. There may be two or more objects, to be sure, but they must always express one idea. They must always be so closely associated by some perfectly obvious relation that nothing could be spared out of the picture. Take up any picture you please and go over it item by item. Ask yourself, could *this* be left out, or *this*, without spoiling the picture? If it is not absolutely necessary to the integrity of the whole, it ought not to be there.

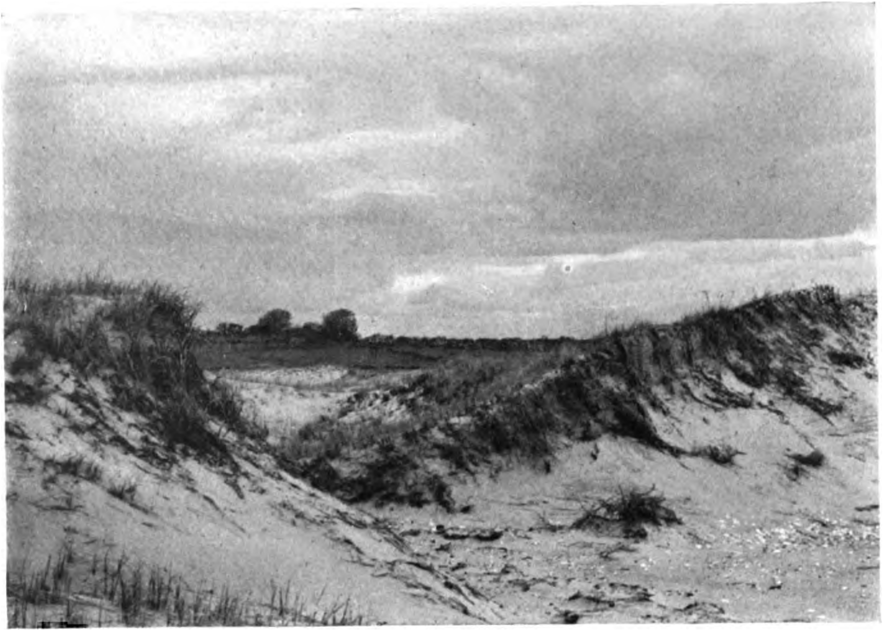
The usual mistake is to attempt too much, to try to put too many things into one picture. The fine thing about Mr. Barstow's "apple tree" is the simplicity of the picture. It is a mere sketch, but beautifully complete and adequate. A road, a bridge, a stone fence, a flock of sheep, a hill, some trees and a flourish of clouds may make six or seven good pictures, but they can't all be put into one. Some single object, or, more precisely, some single motive, ought to be chosen for each picture. This object or motive should be sufficiently striking, interesting, or suggestive to justify the picture. An object which is not striking, interesting nor suggestive had better not be photographed at all. When the principal feature or motive of the picture has been selected, everything else must be subordinated to it. Every object not directly connected with the principal



***Plat.* 5½ x 7½**

HAYING: WHITE MOUNTAINS
Henry Troth

7-2



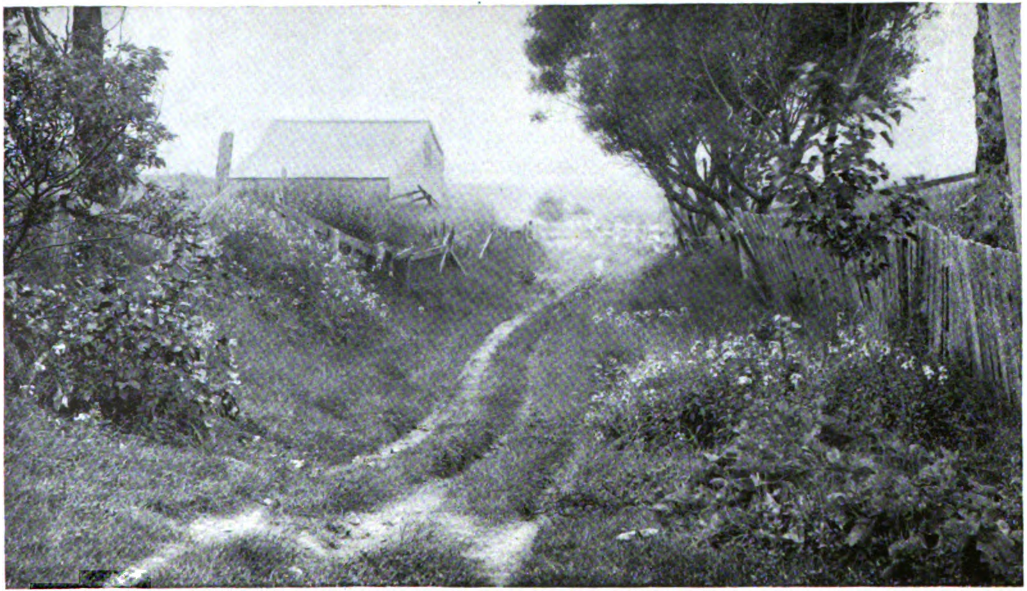
Plat. 5 x 7

SAND DUNES

C. Grant LaFarge

Aris. Plat. 4⅜ x 7 ½

A CANADIAN RAPID
R. B. Whyte



Plat. 4½ x 7¾

A NANTUCKET LANE
Henry Troth

one should be excluded, if possible, and the more conspicuous and beautiful such secondary objects are, the more necessary their exclusion becomes. Minor objects may be subordinated by placing the camera so as to throw them into the background; sometimes they may be put out of focus; at other times the lines of the composition may direct attention to the principal object and away from subordinate objects.

This brings up the whole important subject of composition; but perhaps we had better return to that later after noticing the other fundamental principles of picture-making. Other principles have to be considered, more or less, and other tests sometimes take first place, but, one time with another, unity is the chief test of good composition.

The Matter of Variety

Large landscapes, out-of-doors, sometimes exemplify the sin of monotony, but a single photographed landscape is never subject to that shortcoming. A series of landscapes by a single worker may be monotonous in subject, in method of treatment, in composition, or in the character of the prints. In all these things the photographer should seek variety,—but variety does not belong to any single photograph.

Certain subjects appeal to certain temperaments. One man sees every pretty tree or group of trees; another sees lake and river; another is fascinated by the ocean; another cares for architecture; and so on. These various subjects are so diverse that they are always roughly classified among photographers. Thus we have street photography (THE PHOTO-MINIATURE No. 14); tree and plant photography (P.-M. No. 13); marine photography; cloud photography (P.-M. No. 24), and the like. It is very nice to have a specialty in photography, but the serious worker will seek a broader experience than any one line can yield. He will beware of monotony in his subjects. He will seek variety.

Some workers show facility in only a single method of treatment. One man always gets the light over his left shoulder, another always throws the center out of focus, and the next man has some other trick. The careful worker will seek variety in all these things. So, Besides having a character, a man must have thorough command of photography in order to put individuality into his pictures. He must be an expert worker. The "button pusher," and the careless, slovenly chap, and the one who doesn't know Velox from carbon, cannot expect to interpret in a picture such subtle and elusive elements as the emotions of a man's soul.

Propriety

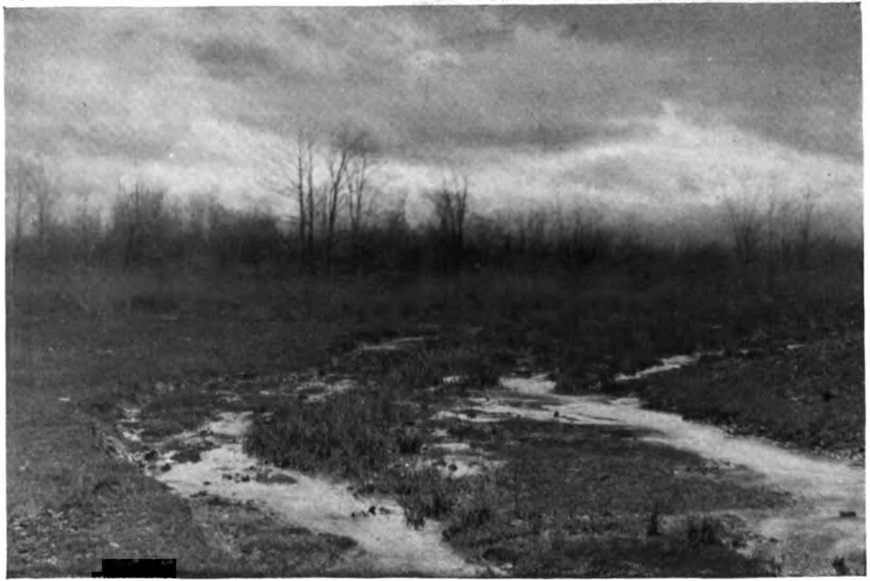
Propriety is a universal test, though as a test it is not often called into requisition in photography. Occasionally one sees some impropriety photographically perpetrated, like a picture of a baby crying,—which seems to me to be a stupid, inhuman joke. Sometimes one sees studies of the nude which fail to be artistic, and are therefore improper. And,—to speak more strictly to the avowed point of this essay,—nude figures in a landscape seem to me always so manifestly out of place,—always excepting boys a-swimming,—as to be strictly classifiable as improprieties.

Propriety, however, though a universal test, is not an absolute quality. It is merely our judgment of the relation existing between a picture and the environment in which it is shown. Objects which would be proper to one set of surroundings may not be suitable to another. This is especially true of figures in landscape. Human figures are the best of subjects for photographic study, but it is difficult to mix them with landscape accessories. It requires keen judgment, good taste, and a live knowledge of the proprieties.

Finish

Every work of art should be carefully finished. Though certain workers habitually neglect this requirement, such neglect is not a mark of genius. A poem may be well imagined and fairly written, but poorly finished. It is the diamond-like polish of "The Chambered Nautilus" which pleases us as much as the sweet imaginativeness of the figures. And so every photograph, whether of landscape or of any other sort, must be perfectly done in its way in order to be altogether satisfying. This means that adequate knowledge of photographic processes must be combined with the most scrupulous care of all points, in composition, lighting, focus, exposure, development,

A TRILLIUM LANDSCAPE
O. P. Beckley



P. O. P. 4½ x 6½

DREAR NOVEMBER
F. C. Baker

after-treatment and in printing. Perhaps one should say especially in printing, for the print is the only part of the work ordinarily open to public examination; and there may sometimes be defects in the negative which are explained away, or even turned to account, in the finished print. Told in a word, this fundamental test of finish operates with the photographer to the continual discouragement of carelessness. That's the whole moral.

Composition

The primary consideration in landscape photography is doubtless composition. Composition deals first with the grouping of objects; with the relation of masses—as in the proportions of earth and sky; with the direction and relation of lines; with distribution of light and shadow and, finally, with sundry details peculiar to each picture. For illustration take the simplest possible case, that of two neighboring oak trees on a hillside. Examine the composition first with reference to the trees only. It will be discovered at once that there are two directions in which one tree is hidden by the other. These two lines of view are unavailable. If now we connect these points and draw another line at right angles to the first and passing between the trees, we have another axis locating another series of unavailable points. Viewed from any point in this second line the trees have equal prominence and attention is balanced between them. The photographer will therefore move into one of the quadrants between the rectangular lines and will take a position such that the better formed or more interesting of the trees comes nearer the camera, while the other is appreciably farther away. The second is a companion to the first and keeps it from being lost and lonely, but the nearer tree is evidently the center of the composition and the object of principal interest.

The hill slope on which the two trees stand has now to be investigated. The way in which the brow of the hill cuts the sky will be altogether different in each of the four quadrants which the photographer has left to his choice. In one position the trees will loom against the sky; in another they will be dwarfed in the hollow. Moreover the angle at which the hilltop cuts the plate is of great importance, as is also the slope of the land in the foreground. There may be three or four points of view between which it is hard to choose, but it is not likely to be so. All the rest of possible thousands of points can be quickly discarded as soon as some systematic thought is given to the composition.

Earth and Sky

The most important element in many compositions is the sky-line, or the line dividing the sky from the earth, and the objects resting on it. This line may be straight, broken or undulating. In either case, the whole character of the picture is so much affected by it that we may safely say that it gives us the key to the whole picture. No photographer could expect to group the most attractive objects in such a way as to make a quiet, peaceful, pastoral landscape, if the sky-line were sharp and zigzagged like the streaks of lightning on a July night. Mountain scenery with a straight horizontal sky-line would be a failure. Shady summer woodland demands a gently undulating sky-line. Of course, these things cannot all be settled by prescription: it is primarily a matter of feeling on the part of the man making the study; but the predominating importance of the sky-line cannot be ignored, nor the necessity that it shall harmonize with the general character of the whole picture.

The proportion which the sky shall bear to the foreground is often a matter of the gravest import. In general a low horizon gives the effect of distance, while a high sky-line gives the opposite effect. There may be exception to this rule, however, particularly as regards certain prominent objects at moderate distances from the camera. Consider John and Mary on the lake shore. John holds Mary's hand—but there is no impropriety in that, for he is helping her into the boat. The level beach curves away indefinitely, with just enough rocks strewn about to save a photograph from flatness, and the photographer stands ready at a hundred paces from the boat. Now, if he puts John and Mary and the sky-line high up on the plate, he shows a long foreground on this side of them, and they seem to be farther away than if he put the sky-line lower down.

As a general rule, almost without exception, the sky-line should not bisect the plate. Neither should it be too sharply defined. This latter matter, however, belongs rather with the subject of atmosphere, where we will take it up again.

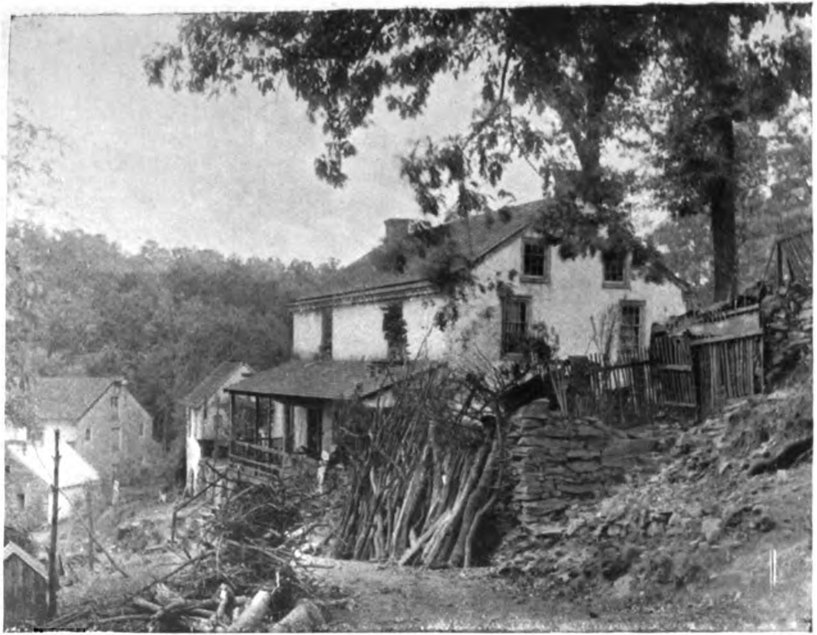
Adjustment of Masses

There are often various parts of a landscape which have to be treated "in the mass"—not as separate objects. There may be part of a large building, a large rock, a cliff, or a big tree in the foreground or middle-ground, or there may be a part of a hill or mountainside, a part of a sheet of water or other large surface, which is not seen as a whole, but which yet occupies a considerable space on the ground-glass (and, *entre nous*, the young photographer who wants to learn something and who would just as soon some day do better work, should never make up a landscape from what he sees in the finder. He should always set the camera on the tripod and study the composition carefully on the ground-glass). No general rule can be given for the management of these large masses, except that they must be always carefully handled. Beware of bisecting a plate by the division of masses. If there are three or four separate masses, they must not be set off sharply one from another. If there are more than three or four separate masses, the composition is a bad one. Let it alone. Mr. Ingram's *Upper Darby Creek* is an example of the proper handling of masses.

Lights and shadows are apt to fall into masses, too. Such blocks of light and dark affect the picture just as more substantial material masses do. They are to be handled with equal care and in much the same way. Beware of lights and shadows broken up in such a way as to look spotted. This happens frequently with trees in middle distance, especially with snapshot work in midsummer,—such photographs as Gladys brings home on her roll of cartridge film when she comes back from her vacation in the mountains. Here one sees a half print, which, by itself, might be a polka-dotted apron, a latticed piazza or a brindle cow, and which is explained only by some figure thoughtfully posed on the other half of the print. In photographs taken through tree-tops toward the sky, a position which is often very tempting, this spotted appearance is aggravated by the halation which is bound to occur. A friend of mine, who knows too much about mycology, calls these shothole-fungus photographs.

Masses of light and shadow, equally with all other masses and objects in the composition, should stand in some sort of obvious relation to one another. They should cohere. They should coöperate in the expression of the one motive which animates the whole landscape. These are general terms, but it is impossible to be specific. Careful, intelligent study of each composition is required to see that these masses really do hang together. One often sees them in pictures falling apart and quarreling with one another.

About Lines It happens not seldom that the composition is dominated by certain lines. This is true of the "Winter Brook," reproduced as one of the inserts. There are two masses of snow separated by a strip of brook, one smaller mass of pine forest, and a tiny patch of sky. But the lines dividing the masses are unduly prominent and really make up the composition. The picture, which no one thinks pretty, is put in here just to illustrate this point. Here the two lines which bound the brook, the fringe of alders on the bank, and the line where pine trees meet the hillside all converge at the upper left-hand corner of the picture. There are two advantages in this: first, it emphasizes and ornaments the natural perspective of the composition, and, second, it brings the lines all into one geometric system. These lines seem to be related to each other. Mark them out roughly with a pencil, obliterate all the rest of the picture, and the lines will still express this co-relation. The same idea, less obviously exemplified, appears in a better picture by Mr. Beasley. See his "Haymakers." Lines of roadways, streets, paths, lake shores, sea shores, and the like, often come into landscape views, and are usually the making or the spoiling of the picture. Usually they can be made to give the perspective to the composition. For this purpose they must not run parallel to the plane of the plate, and it is best that they should not run exactly perpendicular to it. Nevertheless great care has to be exer-



Plat. 6 x 8

UPPER DARBY CREEK
W. H. Ingram

Plat. Cab.

C. Grant LaFarge

cised in applying this rule, especially if the lines are numerous and prominent. Mr. Yellott has pointed out in The Photo-Miniature No. 14 that in street photography one may easily cut his plate up into an endless system of triangles by catching a series of intersecting straight lines just at the most unfavorable angles.

Foreground, Middle-ground, Background

An ordinary complete landscape consists of four more or less distinct parts, one or two of which may sometimes be suppressed. These are foreground, middle-ground, background, and sky. The sky has already been treated of in its relation to the other three, and may now be temporarily ignored. Very much depends, however, on the relation of foreground, background and middle-ground to one another, and in the treatment given to each. Sometimes one may be made more prominent; sometimes another. When the camera is tipped down and the sky-line is shoved up, as in the photograph of John and Mary on the lake shore which we made a few minutes ago, the foreground is lengthened; and, in this case, the middle-ground is made interesting by John and Mary hand in hand and just embarking for a trip down the lake. The background is practically eliminated, or ought to be. In other cases, particularly where "cloud effects" or "atmospheric effects" are sought, the background comes into prominence, and the foreground is treated only as an accessory.

Now there are two or three simple generalities which one may remember and use in this matter. The first is that the foreground must always be in focus. I am aware that some of the salon pictures are made with everything out of focus, but they are not worth mentioning as exceptions. Usually it is best to have the detail in the foreground considerably sharp, no matter how soft or fuzzy things may be further back. When the foreground is cut off and the middle distance is treated as foreground, a somewhat similar sharpness of focus is required, though in such a case the eye does not demand the same explicit detail. Great care must be taken that objects in the foreground appear in their proper perspective, and not distorted by the lens. If the camera is not absolutely level, the back swing should be brought into play to correct any improper convergence of vertical lines. Some persons are too careful about leveling the camera bed. Frequently it is better not to have it level, but then the hinge in the camera-back was made for use in just such occasions.

With respect to backgrounds it should be remarked that detail does not belong there. If detail is wanted in any object, it must be brought into the foreground, or, at the very least, well into the middle-ground. The background, then, is to be treated quite differently. Often the objects or the material of the background are best when only suggested. A little black strip hints at a distant forest; or a fuzzy line and two half-formless blotches suggest a fence and the farm buildings. The delicacy with which these impressions are given is often the chief grace of a good picture. It is the femininity of picture-making. The foreground is masculine. A man always plants himself in the foreground and proposes in blundersome, rugged words; but usually not until the woman from the background has offered herself in a hundred gentle flickering suggestions.

Between the masculine and the feminine, we have an indefinite extent of middle-ground which offers scope for greater latitude of treatment. Usually any objects of moderate size, such as buildings, trees, boats, and figures, are brought into this part of the composition. Occasionally one sees figures placed in the foreground; but I think this is almost always a mistake. If a portrait, or even a character sketch is desired, the studio is the place to make it. A landscape makes a poor background for a figure covering one-third or one-half the plate. I will admit some exceptions to this rule; but at any rate the exceptions are portraits, not landscapes, and that takes them outside the present purview.

The Principal Object

In speaking of unity we have already said that there should be one object of paramount interest, or at least there should be one dominating motive in each picture. In the latter case, even, the motive of the picture is likely to center round some one object—there is apt to be one particular point of chief interest. This point or this object must be seized upon as the very first step in the composition of the photograph, and the rest of the composition is concerned merely with the arrangement of other details with reference to this principal object.

In general it is true that the principal object should be near the center of the composition, but never exactly in the middle. Usually it is best to have it above the center of the plate. This rule is too often ignored in landscape photography and many pictures are damaged thereby. The rule, however, admits a great many highly respectable exceptions. Of course no other object of equal mass can be admitted nearer to the camera than the principal object. The lines of the composition should converge toward the center of interest just as much as possible. If these lines point about in all directions, ignoring the principal object, the composition is bound to be a bad one. The focus of the entire picture should also be such as to emphasize the chief figures, though they are not absolutely required to be given in sharp and brilliant detail.

Lighting

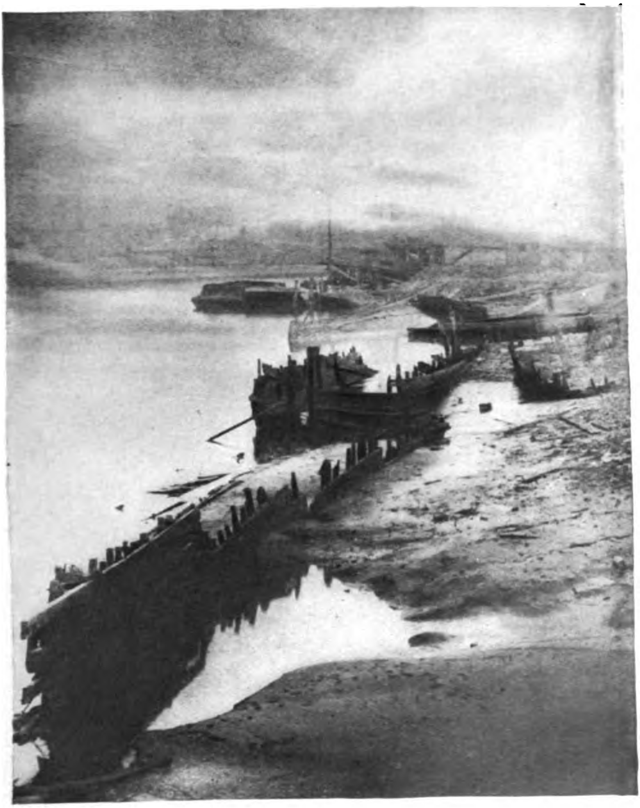
The making of many a landscape picture is in the lighting. Few photographers, I think, appreciate this matter at its true seriousness. The direction of the light usually receives some consideration; but, in my experience, the *quality* of the light is equally important—in many cases, most important of all. Every one has doubtless noticed that the bright light of high noon gives unpleasing results in negative making. It is apt to be white and ghastly. The sky is apt to be an empty hole in the world, and the shadows are solid, black and opaque. The light of the late summer afternoon or of the early morning in April or November is apt to be very much better. So the light of one country is more brilliant than another. For the better part of the year Vermont has a great advantage over Georgia in the quality of its light. At this point, however, light and atmosphere, photographically considered, are hardly separable. Let the rest of the discussion follow under the head of atmosphere; but here we must put one pin, in the fact we have developed; viz., that light varies tremendously in quality according to season, locality, altitude, etc.

Light varies also in quantity; but that matter is taken care of under the head of exposure.

With regard to direction we may remark that the expert worker takes his light from any angle and anywhere, according to the subject in hand. Only the light must come from *somewhere*. The situation in which one sometimes finds himself when a bright illumination is thoroughly diffused, so that every object is lighted all round and there are no shadows anywhere—this is bad, and perhaps the only situation from which the landscape photographer should really retreat. The beginner always turns his back to the sun and aims his camera in the other direction, but probably this is the most disadvantageous angle at which to work. The easiest position of all is that which brings the axis of the lens at right angles to the rays of light, but this method should not be conventionalized. That is, one should not make a picture that way simply because ninety degrees is a good angle, but should rather use this position when best for the particular problem in hand. As one turns further toward the light greater caution is required. The only positive rule is that the sun must not shine directly into the lens, and even this is sometimes set aside. Frequently good pictures are made with the camera so nearly facing the light that the sun's image is kept out of the lens only by shading with the hand, the focusing hood, the slide from the plate-holder or the photographer's old straw hat.

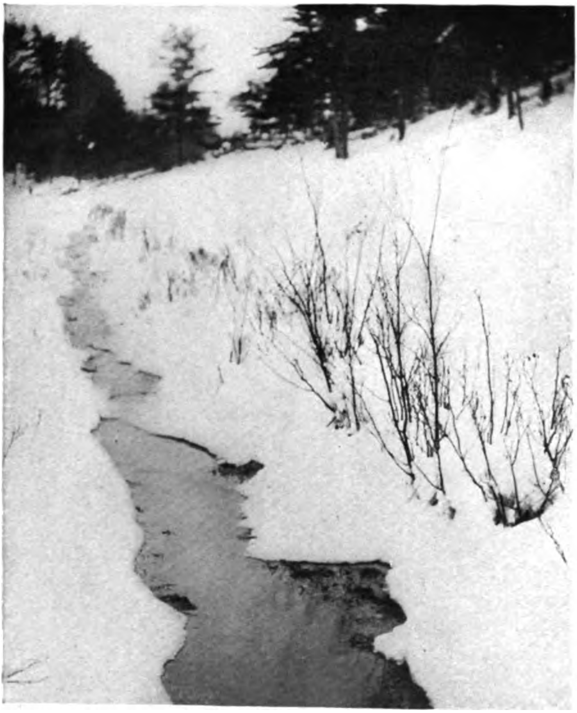
Shadows

Perhaps this is the most convenient point in the discussion for mentioning the matter of shadows. Shadows naturally fall in with lights. The life and interest of a landscape view frequently lie largely in the shadows, and many an otherwise fine picture has gone into the second class simply because the shadows were not carefully managed. The ideal here, as in almost everything else, is to take the middle course. Good strong shadows give life and color and perspective to a picture, but heavy, black, opaque shadows throw it into mourning at once. To get transparency of shadows — to have shadows with detail visible through them — adequate exposure is essential. "Expose for the shadows and



Plat. 7 x 9

ABANDONED
George D. Firmin



4 x 5

WINTER BROOK
F. A. Waugh

let the high lights take care of themselves" is the old rule. Theoretically, the best shadows should be secured by the use of a hard-working, slow-going developer, like pyro or hydroquinone; but, on the contrary, it is certainly true, as a matter of experience, that the softest shadows are secured by the ordinary worker using a soft-working developer, like eikonogen or rodinal. After a great many experiments in this matter, I am inclined to believe that the theory is correct, and that the trouble lies in improper adjustment of exposure and developer. Fine transparent shadows can certainly be made with pyro, and even with hydroquinone they are not impossible. By reducing the bromide and increasing the alkali, any of the developing agents can be made comparatively soft-working. Tolidol is especially easy to adjust to needs of this sort, while the quick-working rodinal always gives soft shadows.

The long and sprawling shadows of early morning and late evening are attractive from every point of consideration. They are full of grace, poetry, invitation, suggestion, mystery. The amateur camera man is earnestly recommended to study them often and carefully, and with his best feelings uppermost.

Atmosphere

Atmosphere is, perhaps, less something to be photographed into the negative than something to be imitated in the print. Nevertheless, both things are possible and highly legitimate. A landscape without atmosphere is unbearable. Perhaps no other single quality so quickly distinguishes the work of the expert from that of the novice as this matter of atmosphere. The photographs of the beginner, with their staring white empty skies, look as though they were standing in a vacuum—as though all the air were pumped off and the objects were left there in the glare and suffocation of eternal punishment. The short exposures of the snap-shot method, too exclusively practiced by beginners, are largely to blame for this. A full exposure is almost always secured in the sky, but the foreground is insufficiently timed. The difficulty is aggravated by a forced development with some hard-working developer. A pyro-potash developer, used by some beginners, almost always brings fatal results. Even the mildest pyro-soda developer, in my experience, works too strongly on the skies, and steals away their atmosphere ere one is aware. Pyro-acetone is about half way between pyro-soda and pyro-potash in culpability. Hydroquinone is apt to be bad also. Eikonogen is excellent in some cases, and bad in others. I don't believe I know what the difference is, but it appears to be a matter of getting the exposure just exactly right. For my own work, I have found tolidol the most controllable of developers for this work—but let us come back to that a little later.

There are various tricks in use for securing the effect of atmosphere in the photograph. All of them are either good or bad, according to the results they give. And the results depend directly on the intelligence with which the various methods are used. One of the commonest subterfuges is to throw the composition partly or wholly out of focus. Putting the background slightly out of focus is almost always a safe and decent thing to do, and goes as far as any one thing will to suggest an atmosphere for the picture. Some photographers judiciously kick the tripod or shake the camera during exposure, thus spreading the composition around agreeably over the plate. This proceeding always reminds me of the man who was unsuccessful in his use of the shotgun until he adopted the expedient of shaking his fowling-piece violently as he fired it off, thus scattering the shot all about. By this means he managed to hit everything flying, and came home with an overflowing game bag.

Generally, however, it is easier to put atmosphere into the print than to put it into the negative. The immense popularity of the platinum papers is largely due to the atmospheric suggestion which they seem almost invariably to carry. Moreover different sorts of atmospheric effects can be very readily secured on platinum paper by an experienced worker, especially under brush development with a glycerine retarder. Sometimes whole gorgeous skies (I never made a sunset nor an aurora borealis) can be worked in with the brush in this way. Local toning with mercuric bichloride or uranium will often give most agreeable results. Directions for the use of these reagents will be found in The Photo-Miniature No. 7, or in any other work on platinum printing. In bromide papers, atmospheric effect is better secured with the coarse, matt-surfaced papers. The same thing is true of the "lamplight papers." When using Velox, and other papers of that class, brush development will often be found advisable for the very reason given above in connection with platinum working, *videlicet*, the development of the sky can be controlled and atmospheric result modified to some extent to suit the fancy of the worker. The gum-bichromate print perhaps offers the best medium of all for rendering atmospheric suggestion. One can put in just about what he pleases, and leave out what does not please. The management of atmosphere is especially easy; and doubtless this is one of the principal causes which have helped to make the gum-bichromate method popular with picture lovers.

More About Atmosphere

Of course it is desirable to get as much atmosphere as possible into the negative. One's success in this part of the work is apt to vary shamefully. On one day the negatives are all rich and ruddy with light and air; and on the next they are empty and vacuous as the hired girl's conversation. After one has spoilt a good many plates, and has reflected sufficiently on his failures and his successes, he will learn to know pretty well by the look of things and "by the feel o' the air," as Riley calls it, whether there is anything there which can be photographed. The hour after a summer rainstorm clears away is usually propitious. Early morning is usually favorable, and so is late afternoon. Avoid mid-day exposures and those made late at night. Some localities are blessed with much better atmosphere for photographic purposes than others are. Northern New England and eastern Canada have the best atmosphere on this continent, while there is none at all, photographically considered, in some of the southwestern states. I have found it very difficult to get a decent landscape picture south of Mason and Dixon's line. England is the ideal country for atmosphere in photography, I believe, and I long to go there with a trunk full of good plates and nothing to do but to tramp about the country roads. I am told there is always something in the atmosphere there: when it is not fog or coal smoke it is something else only less tangible and photographable.

Some of my photographic friends tell me that they have had good success in Florida and Georgia, and other southern localities, in making their landscapes through a ray-filter. I have tried this with decidedly discouraging results, as regards these southern localities. Nearer home I have had better success with a ray-filter; and I know that it is often a means of saving something for the top of a landscape. Orthochromatic plates will frequently give better results in the same way, and for the same reasons; in fact, many workers claim that the orthochromatic plate is indispensable for the securing of atmospheric effect.

Another trick for securing the effects of atmosphere in some negatives is that of printing through various materials. Perhaps thin sheets of white stationer's celluloid are the most convenient. One or two of these sheets are laid between the film side of the negative and the paper on which the print is to be taken, and the exposure goes on as usual, except that it will probably require to be longer. A thin glass plate, as an old negative cleaned, may be used in the same way, though, unless it be very thin, it is apt to make the whole print too fuzzy. Cleaned films, such as are used in making film negatives, may be similarly used. Various kinds of paper, as thin rice paper, give peculiar and sometimes pleasing effects. I have occasionally made a good snow scene by printing through rice paper, such as comes wrapped around certain kinds of print paper. Silk bolting cloth has been used successfully by some amateurs, and I have even seen a professional portrait artist use this means of softening a harsh negative for a customer with a bad face and a determination to have a sharply focused picture. The difficulty with all these printing-through schemes, for landscape work, is that they soften all parts of the print alike, whereas the foreground does not need it, and sometimes will not stand it. The distance only needs the harshness taken out. Still these methods are so easily applied to any negative that one finds himself often using them; and I can not see what reason there is for deliberately throwing a whole picture out of focus when it can be so easily blurred in the print. Then, there are lenses, such as Dallmeyer's Stigmatic, which lend themselves to selective diffusion at the will of the worker.

"Compensating Negatives"

Another plan, which may be original with me, serves the same general purpose of correcting too great a contrast between sky and land. It is suitable to nearly all negatives in which the skies are too dense, providing there is not too much detail required in the foreground. The idea is taken from Mr. Stieglitz's method of making compensating cover glasses for lantern slides. The negative to be treated is placed in a printing frame "right side out," just as though a print were to be made. On it is placed an unexposed plate, film side up. That is, the two plates do *not* lie film to film. The fresh plate is then given a very short exposure, about one-fifth as much as would be given for a lantern slide or a transparency on a plate of the same rapidity. It is then slowly developed, the operator being careful not to carry development too far. No part of the plate should be allowed to get dense and black. Just a thin, hazy positive is all that is required. This will not be very sharp, from the fact that the two films were not placed together. When development has been carried far enough, the plate is taken out, fixed, washed and dried, the same as any ordinary negative. This positive is employed with the negative, the two being put together and the print being made through the pair. In printing the position of the two plates is reversed—that is, the positive goes into the printing frame first and the negative is laid on top of it. There is really no difficulty in adjusting these plates to one another and the print is not marred in any way unless the positive is made too thick. Even moderate details are not obscured. It may require two or three experiments to make this plan work well, but it can be made to do some fairly good things in softening harsh and empty skies.

Concerning Clouds

The great vogue which cloud photography has enjoyed is certainly due in part to this desire for atmosphere in the landscape. One of the cloud-graph fellows, with a knack for the right word, once said that nobody wants a "bald-headed" landscape. His epigram has become almost a proverb in certain photographic circles. For myself I think that cloud photography has often been carried too far. I see in this merely a photographic synecdoche, in which one sort of atmospheric interpretation is put for the whole super-terrestrial treatment. A cloud-topped landscape is a fine thing when well done, but when badly done it is just as much a failure as anything else. Especially when the clouds are gathered in from two or three other negatives and piled upon a strip of country not suited to them, the result is plainly forced, and is highly unsatisfactory. According to my experience the expedient of printing-in clouds is seldom attended with full satisfaction, though I have often seen it exploited as the one infallible remedy for all the shortcomings of landscape photography. Still in some cases this is feasible. I have seen the happiest results occasionally from combining the clouds of one negative with the dry land or water waste of some other negative. "Printing-in" ought to be remembered as one of the means of making good pictures in certain circumstances. It would be in order to give directions for this work here, but these processes have already been described in the preceding number of The Photo-Miniature.

Undoubtedly the best way is to have the clouds in the negative. The use of isochromatic plates is often to be recommended for the better results they give in catching clouds or other atmospheric suggestions. For my own work I do not use isochromatic plates, largely because I like to make gum prints; and for gum printing an isochromatic negative is neither necessary nor suitable. The ray-filter is, of course, the easiest and most direct means of securing clouds, and the landscape photographer is seriously short in his equipment when not fitted with something of this sort. Ray-filters and isochromatic plates—these should be thoroughly understood by the landscape photographer and carefully experimented with from time to time; but neither should be used for all subjects, and never without some well thought-out reason.* There is one caution always to be given to those who want to get the clouds into the same negatives with the rest of the landscape, and that is to be careful of underexposure. I know some well-meaning amateurs who sacrifice many good landscapes for indifferent cloud effects. Always give the landscape itself a proper exposure. Get the clouds if you can. In many cases the negative may be balanced by suitable local reduction of the sky, but it is very hard to intensify the foreground when it is too thin.

Other Schemes

Moonlight effects, storm scenes, sunrises and sunsets, and other special treatments of light and air naturally come up in this connection. Moonlight effects are usually secured by underexposure, and the conventional way of doing it is to point the camera straight at the sun, pull a cloud over old Sol's face, and snap the shutter quicker than a well-trained auctioneer could say the name of Mr. Jackson Robinson. This is such a simple trick, and has been practiced so much by children, that grown people may be content to let it alone. It may be noted, however, in passing, that moonlight and twilight effects may be secured just about as well by underexposure of the print as by underexposure of the negative. This works especially well on the bromide and lamp-light papers. Occasionally good results may be had in blue prints from the same method, particularly with contrasty negatives. It is the easiest thing in the world to paint the "crescent moon" and a whole firmament of stars into the negative; but this, too, is a trifle too much like playing marbles. Occasionally—very occasionally—one sees some of these "faking" schemes arrive at a good result, and then it is always immediately justified in itself. But for the greater part they are not to be seriously considered.

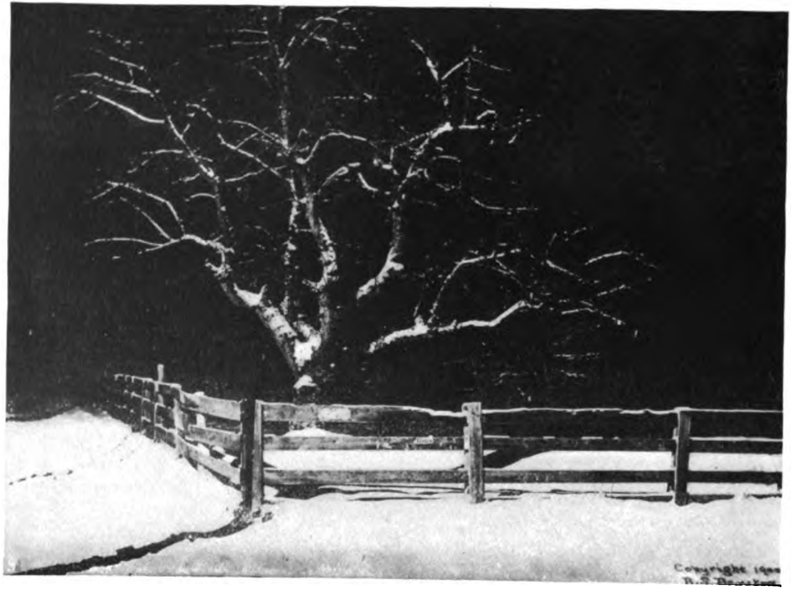
---

*The incontestible advantages offered by orthochromatic plates, i. e., plates corrected to record the varying luminosities of colored objects, are not here disputed by the writer, who desires simply to emphasize the need for intelligence in their use. Wherever we attempt to record color by photography an orthochromatic plate must be used unless we are totally indifferent to the progress of photography.—EDITOR.

Specialties In the paragraph on variety the photographer was warned against the too exclusive study of any particular class of landscape views. It is best to have some experience in as many lines as possible. Yet after that general experience is secured the pursuit of some specialty yields still greater instruction and satisfaction. Almost every one has a special taste or a peculiar opportunity for some particular line. The taste should be developed; the opportunity improved. The very best photographs are made only after long experience and many failures with views of one general nature. Cloud photography has been a favorite pastime with many camera carriers. Marine photography appeals to others. One of my acquaintances is always after wild flowers, shrubs and trees. Snow scenes have seemed much worth while to me, partly from the difficulties which they present. And, by the way, my experience in making snow photographs leads me to recommend a slow hard-working developer with a great quantity of bromide. I give my plate a generous exposure, say a tenth of a second in bright sunlight, with the stop at *f*/8. Then I use a strong developer with about fifteen times the amount of bromide usually recommended, sometimes as much as one-tenth the entire bulk of the developer. Another man likes the pastoral flavor of a photograph full of sheep and cows, and he takes to the barnyard early and late. Mr. Whyte, who lives among the fascinatingly wild and tumultuous streams of Canada, has been deeply impressed with their power and insubordination; and for some years he has been studying to put the spirit of those roaring Canadian rivers into his photographs. Now any ordinary waterfall is an impossibility to the photographic parvenue, to say nothing of the plunging rapids of the Gatineau and the Gaspé; but Mr. Whyte has learned to catch them. One of his photographs is reproduced here, and though some of the fine detail is necessarily lost, one can still see the foam and spray dashed up and looking like the white horse's mane of "la rapide que s'appelle cheval blanc."

One such success is worth a whole year of photographic struggle and of repeated defeats.

S. S. H. A. Beasley



Plat. 5 x 7

THE OLD APPLE TREE: BY ELECTRIC LIGHT
Copyright, 1900, by R. S. Barstow

Cameras Almost any camera will do for landscape work. In fact the little fixed-focus dollar cameras sometimes produce admirable sketches of field, forest and lake. Everyone must have been struck by the really satisfactory character of some of the enlargements seen in the camera dealers' windows and made from negatives taken with small, cheap instruments. The better made hand-cameras are always suitable when intelligently operated. Any one who has read THE PHOTO-MINIATURE No. 3, and who has really mastered his instrument, can get on very nicely with the hand-camera. Still it is usually better to have a look at things on the ground-glass. Two looks are better yet. Photography is like matrimony: the picture made in haste is repented of at leisure. A good, stiff tripod, with a camera which will sit solidly on it, makes the really desirable outfit. Of course lightness and portability are paramount considerations with many outdoor workers. There is the one who goes out primarily for a walk, and who doesn't care to be loaded down with anything, but who would be glad incidentally to photograph some of the inspiring views which he sees. Then there is the cyclist, whose ordinary baggage consists of a tooth brush and a second handkerchief; *he* wants no twenty pounds of camera outfit. And then there is an army of people who go on vacations,—to the mountains, to the seashore, to Florida or Canada or to Europe,—and who will take a camera along if it is not too much trouble. I have been fishing myself; and then, when the alternative choice lay between a tripod and an extra rod, the tripod was left in camp. But let every beginner, especially, remember that the tripod is to be used whenever it can be, that the ground-glass and the black hood are to be brought into play, and that the whole situation and composition are to be carefully studied before the exposure is made.

Lenses The frequent successes of the cheap cameras in landscape photography show that it is not "all in the lens." In fact, any ordinary cheap lens, providing it does not show too much curvilinear distortion, will do the work. Frequently it will do it just as well as a hundred-dollar tristigmat. In fact, I could never understand the reasoning of those chaps who buy a hundred-dollar lens and then throw the whole picture hopelessly out of focus. If a general blur is desired, it may be had at a much lower price. The rapid rectilinear lens commonly used on all cameras of moderate price is the most practicable of all lenses. If the lens is large enough to cover the plate fully, and sufficiently well made to work with an aperture of *f*/8, as most rapid rectilinear lenses are, it has all the requirements. The expensive lenses give greater illumination and greater definition. The illumination makes focusing easier. It also makes a shorter exposure possible in some cases. Neither consideration is vital. As for definition, that is something of which one may quickly get too much. Enough is enough; and beyond a certain point the addition of detail becomes a defect. Pictures may be spoilt either way—by focusing too sharply, or by unfocusing too loosely. A man should buy as good a lens as he can afford, and then he should be content. If he can't have the latest Dallmeyer or Goerz, let him console himself that a rapid rectilinear is as cheap as an excursion to Atlantic City, and a good deal better.

Theoretically, the tele-photo lens ought to give the most satisfactory photograph in the matter of perspective, because the focal length of the lens or combination is more nearly that of the human eye. In my own experience, however, this theory has not seemed to work out well. The reason is still lacking. But the ordinary lens, with its focal distance of 7½ to 9 inches, seems to give the best general results. Perhaps it is because we have been so long used to photographs made with lenses of this focus that our minds have become adjusted to this degree of distortion. The wide-angle lenses with their comparatively short focal lengths of 4 to 6 inches, however, make photographs which the eye will not accept. The perspective is too violent. Each picture is, in some visible degree, a separate deformity. The wide-angle lens should be excluded from landscape photography, or used only as an instrument of uttermost resort. In the opinion of many workers the single lens possesses distinct advantages.

Films and Plates

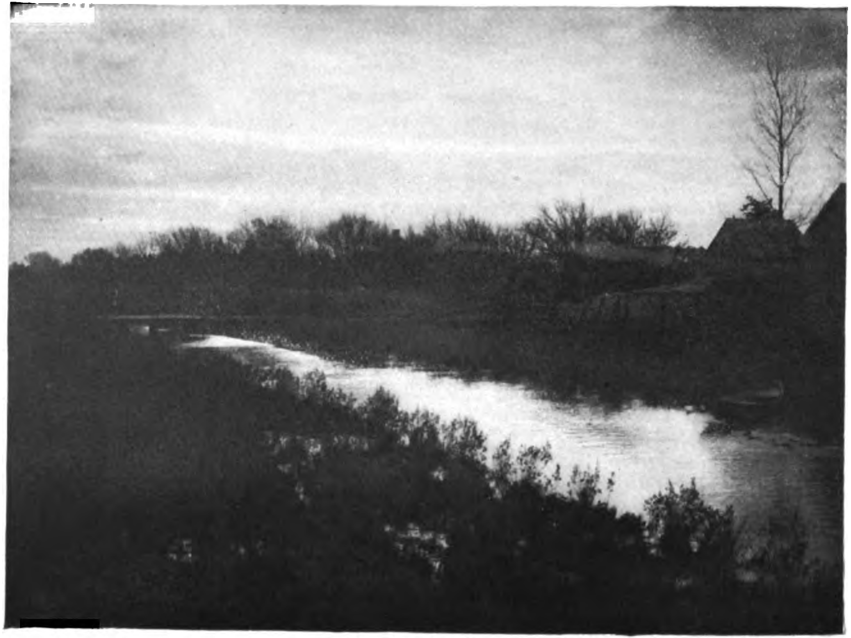
Films are, of course, much more convenient than glass plates for the traveler, and will doubtless be used more and more by those to whom photography is an incident to vacations spent away from home. The cartridge film camera, "loaded in daylight," is a great convenience; and the roll-holder attachments, applicable to many of the plate cameras, offer considerable amelioration of the burdens of photography *en tour*. Any dealer can furnish these, and can explain their manipulation: for myself I can think of nothing instructive nor interesting to set down in connection with them. Since the time when I carried an old-fashioned box kodak to the World's Fair in Chicago, I have never used a film, and, doubtless, I am behind the times in that line of photographic equipment, as many expert workers prefer them.

I have been interested to notice that many makers of dry plates offer plates in three or four grades of speed, about as follows: (1) extra rapid, for drop-shutter work, photographing groups and babies, etc.; (2) very rapid, for ordinary snap-shot and studio work; (3) medium, for landscapes, copying, etc. Now this is something I have never quite appreciated. I have fully tested the slow plate for landscape work, but, for me, it has no advantages. There are many landscapes, especially those in which the immediate foreground is cut off, for which the slow plate is entirely satisfactory. In making views of mountain scenery, especially in the Rocky Mountains, and more especially in the Yellowstone National Park, and such like places, the slower plate may be decidedly advantageous. But for any ordinary trip about home, where landscape studies of various sorts are to be attempted in our every-day atmosphere, I find a faster plate essential. If one wishes to put the trees and grass of the immediate foreground into the picture, it must often be done between puffs of wind, and there is rarely time to spare on long exposures. If we wish to suggest atmosphere and perspective by differences of focus, we want the largest stop in the camera; and this, of course, gives more time. But even if this reduces the exposure on a fast plate to one-tenth, or one-twentieth, or even to one-fiftieth of a second, that is so much the easier, and the result seems to me to be equally good on a good plate. In a word, the case is this: rapid plates are needed so often, and it is so much easier to shorten exposure than it is to lengthen it, that the fast plate is the best for general outdoor use. Some conscientious photographers carry plates of two or three different emulsions, from which they select something to suit each particular case. This does not seem to be generally practicable; but if a man likes that way and succeeds with it he need make no excuses to me.

"The best plate" is largely a matter of taste, and also somewhat a matter of what one wants it for. Also it depends considerably on one's methods of dark-room manipulation. My friend McFarland, who is a walking spectroscope for color, and who wants color values in his negatives whether he has any outlines or not, always uses isochromatic plates. To many persons the beauties of landscape are largely in the colors of sky and lake and mountain. Let such ones photograph what they see and love—if they can! Those beauties are worth striving for, at least, and are not always beyond the reach of the camera-man's genius. Now I care more for line and mass; and so I want a plate which will give clear lines and will pile up the masses solidly where they belong. The isochromatic film is too thin and delicate for me. Besides, as I have already said, I like to make gum prints; and for that business sharp lines and definite masses are more satisfactory. The Cramer "Banner" plate suits me better than any other I have ever tried for general outdoor work. The Cramer "Crown" is equally good, of course, but it costs more, and, except when the exposure is pinched right down to the minimum, does not give enough better results to justify the greater expense. Seed's "26 X" and the Lovell "Extra Rapid" have very much the same qualities. I like the Cramer plate for its behavior in the developing tray, but the result is the same with any of these, or, for that matter, with any first class make. My choice between the two has been determined largely by the men I had to deal with. One dealer didn't part his hair right, and he was indelicate about sending in his bill, and other little things like that—everybody knows

Velox 4 x 5¼

VIEW NEAR ANNAPOLIS, N. S.
Frank T. Shutt



Sep. Plat. 6 x 8

LEWES CREEK, DELAWARE

Henry Troth

how it is—made me prefer to buy of the other dealer, who had more style about his person and more consideration for his customers' feelings. I mention this little matter to show how small is the preference between good makes of dry plates.

Backed Plates Backed plates are very desirable for all sorts of landscape work. Especially when one takes to the woods and begins to have excessive contrasts to handle, a non-halation plate is a practical necessity. It is a good sign that backed plates are coming into the market more and are getting cheaper. It is to be hoped that the time will soon come when we can use them altogether for field work. At present many prefer to do their own backing, largely on the score of economy. There are several proprietary mixtures on the market, all guaranteed to give satisfaction; and Mr. McFarland gives a formula in THE PHOTO-MINIATURE No. 13, page 27. I have tried this formula of Mr. McFarland's with rich disgust. The net result thus far has been two boxes of plates ruined, the darkroom twice bedaubed with red chemicals till it looked like the arena after a bull fight, and all the brushes and bottles stained till they had to be thrown away. Still, very few are as awkward as I am; and I have seen McFarland use this mixture with the happiest results. So far as I know, his laundry bill is not greatly increased by it. Let the courageous test the formula.

Exposure Meters Did you ever hear how the Arkansaw boy weighed the hog? Alexander Jefferson Jones had been away to college (business college at Little Rock). He was at home again, and the neighborhood was *en fête*. Having no fatted calf to kill, the much-joyed father, with the help of his excellent rifle, had slaughtered the biggest "rail-splitter" that roamed the woods thereabout. It was such a magnificent big hog that it ought to be weighed. But there were no scales in the neighborhood. Still that was a small matter, for was not Alexander there? and had he not been to college? He could find the weight of a hog without scales. So Alexander did it. He fastened the carcass to one end of a long pole, which was then laid across the log ridge-beam projecting from the end of the house. To the other end of the pole he tied stones till the hog was fairly counterpoised. Then by guessing at the weight of the stones he was able to compute the weight of the hog! This is just the way an exposure meter works. If one is clever enough to go through all the guesses and estimations required by the meter, and if he has a table of logarithms handy, he can compute the required exposure. Then when he gets to the dark-room and develops the plate he can tell whether he hit it or not.

Now this is merely my experience (I speak of the exposure meter, not of the hog), and I may be wrong. To estimate an exposure requires experience and good judgment. Many persons have a set of "exposure factors" committed to memory and find them very useful. I find the brilliancy of the image on the ground-glass to be the best guide. One must remember, however, that the condition of the atmosphere has a good deal to do with the result, aside from all other considerations. In the thin air of the upper ranges of the Rocky Mountains much shorter exposures are always required; and so a complete exposure meter should have a "geographical factor" added to its complications.

In this connection further caution should be given against underexposure, which seems to be a fault very common among beginners. Always give time enough to get the foreground, and to secure some transparency in the shadows. Get rid of overexposure in the sky as best may be; but don't sacrifice the very substance of the composition for the sake of saving the twentieth of a second out of a hurried life.

Developers and Development

Some remarks on this subject have already been made, but perhaps the matter is of enough importance to merit a few words more. The "hard-working" developers generally seem to be too harsh for landscape photography; and those which give a strong "cast-iron," black-and-white negative are not the best. They make too harsh and contrasty a film,—unless it be for the broad, sketchy work of gum-bichromate printing. Though I am a firm believer in pyro and think it the best general developer, especially for newcomers, still it seems to me to work too vigorously, especially on the skies, and especially when made up with potash. With acetone,—a formula not often tried by beginners,—it is about equally bad in this respect. For making a soft, rich negative with a perfectly normal exposure, or with slight underexposure, eikonogen is one of the best developing agents. For this sort of work I prefer the following single solution formula: eikonogen 3 parts, sodium sulphite crystals 12 parts, potassium carbonate 5 parts, water 100 parts.

For adequate exposure, and especially for overexposure, I like tolidol. It is excellent, too, for making snappy gray-black negatives for gum-printing, though somewhat the same result may be secured with hydroquinone or hydroquinone-metol. In using tolidol, I find it advantageous to use an excess of the reducer with a large addition of bromide, especially when strong negatives are required. I have arranged a formula of my own for this sort of work, founded, however, on Cramer's "process-work formula." It is as follows: *Solution A*, water 500 parts, tolidol 17 parts, sodium sulphite (crystals) 35 parts; *Solution B*, water 500 parts, sodium sulphite (crystals) 70 parts; *Solution C*, water 500 parts, sodium carbonate (crystals) 175 parts (or "dry" 70 parts). For development of good exposures take 35 parts *A*, 25 parts *B*, 25 parts *C*, 100 parts water, 2 to 5 parts of a 10 per cent solution of potassium bromide.[*] For extra strong negatives, or in case of overexposure, increase the amount of *A* slightly up to 50 parts, and increase the bromide solution as needed. I often use as much as 20 to 25 parts of bromide. This developer is very easily controllable. For more rapid development, increase *C*. For greater contrast, increase *A* and *B*. For density, increase *A* and the bromide. For soft effects, increase the water and solution *C*. Other variations will suggest themselves with experience.

---

[*] This formula is copied from my notebook, in which "parts" always reads "grams" or "c. c." I use the metric system of weights and measures exclusively, and find it a hundred times more convenient than drams, minims, ounces, scruples and all such rubbish — all of which one sometimes finds in a single recipe. I don't see how an intelligent and self-respecting worker can use any other than the metric system.— F. A. W.

(A simple explanation of the metric system is given in THE PHOTO-MINIATURE NO. 23: *Photographic Manipulations*.—EDITOR.)

For making thinner, softer negatives, particularly where clouds, atmosphere and other semi-isochromatic effects are desired, I have found rodinal an excellent developing agent. I use it in distilled water, in the proportion of 1 to 25. Overexposure seems to be almost fatal with this developer, however, as it does not behave well with a restrainer.

It would be altogether unfair to leave this discussion, however, without saying that the matter of developers, equally with the matter of plates, is chiefly a question of judgment, of individual needs and of individual experience. "One man's meat is another man's poison" could not be a better proverb for any other application. The beginner should always select some standard plate and some convenient developer, ***and should stick to them until he has mastered them.*** When he has learned to make a good negative with these materials under all ordinary conditions—and not till then—he should extend his experiments. The man who is really serious in his photographic work, and who has learned one set of materials thoroughly, should experiment with everything within reach. He ought to learn the use of all plates and all developers to know their good points and their faults; and he ought to know all printing processes. But we are coming to that presently! The point is only that a photographer should be well informed. He ought to know the ins and outs of the business, like a bluejay knows the cherry trees.

Printing Processes

All printing processes are applicable to landscape photography, and what has been said above is true of no part of the work more than of the printing. Many workers fall into a rut photographically. They get used to aristo-platino, or to velox or to carbon, or to some other medium; they get their work-rooms stocked with materials for this favorite process; and, what is worse, they grow to be partisans of the one medium of expression and think it to be the best one. As a matter of fact there is no best printing medium, not even for a given subject. One man will print a subject in platinum, another in gum, and another in cyanotype, and each will like his own best, and each is right in his judgment. What one ought to do, however, is to cultivate first a feeling for the best results of each printing process, and second the manual experience which enables him to secure these results for himself. The broadest catholicism is the best. Each new landscape, then, which one endeavors to study with his camera, comes to the ground-glass unblurred by the mist of prejudice. One sees it originally as it really looks, and not as he would like to have it look in gum or carbon. After he has caught the spirit of the scene,—after he has been filled with the beauty and the inspiration of the place and time—he may cast about in his mind for the truest means of interpreting them into the photographic language.

The "Blue Print"

Roughly, though, one may say that certain processes are suitable for certain circumstances. The common and often despised blue print is one of the best expressions of many landscapes. I cannot understand why blue prints should not be hung at the exhibitions. If some one would make a gum-and-pigment print as good as a first-rate blue print it would pass any jury in the country. The blue print offers an especially suitable medium for rendering all those pictures of only moderate excellence —the kind we mostly make!—which one cares for a little and wants to keep, but which are never destined for the surprise of friends nor wrath of juries of selection. A bookful of blue prints commemorative of a summer's happy vacation—how often have we seen it, and how perfectly adequate and satisfactory it is! I want to make a plea for the blue print; and while I am about it let me add a word of practical advice. Satin Jr. is a beautiful paper, and there are others in the market; but nothing in the world can compare with blue paper freshly made by the one who uses it. It is largely imagination, I know, but blue-print paper never seems so good to me after the day it is made. I like to have it in the printing frame just as soon as it is dry. When one makes his own blue-print paper, too, he has the greater latitude of choice of papers, for the texture of the stock makes a great difference in the quality of the blue print, just as it does in other printing methods. If we care to use fancy rough papers, like Michallet, Julio, Lalanne, and that sort, we can get some choice effects in blue prints. Lalanne, in particular, makes delightful stock for blue-printing, though Julio is very much like it. One hardly ever sees such papers as these mentioned in connection with blue-printing, because blue-printing is commonly disparaged as something cheap and makeshifty; but they are very much worth trying. If we use good paper of this sort, and make it up fresh a few sheets at a time just as we want to use it, we may use some of the simpler formulas for our solutions. I like to make up the solution fresh every time, too, and prefer the simple single solution formula from Millen, as follows: Potassium ferricyanide, 10 parts; iron-ammonium citrate, 15 parts; water, 100 parts. Dissolve, filter and use at once. This solution will not keep, and the paper should not be allowed to get old. A softer, warmer color can be secured by reducing the iron-ammonium citrate to ten parts.*

Other Printing Methods

For convenience and rapidity of manipulation, the "lamp-light" papers are certainly best. No one is making exhibition prints all the while nor most of the time, and many good people don't care to bother with that sort of thing anyway. All the rapid bromide papers are good for landscapes of various sorts, but the matt-surface papers are most commonly useful. Even the common printing-out papers have their uses, and should not be entirely neglected. When it comes to process work, such as photo-engraving, they are better than any other; and it has been the aim of this monograph not to lose sight of the many semi-technical adaptations of landscape photography. Some of the landscapes which have been shown in ozotype have revealed desirable possibilities in that process; but as yet it is too little known to be the subject of practical discussion.

Exhibition Prints

The course of affairs in American photographic exhibitions has clearly shown that platinum and gum-bichromate are the two most-favored processes for securing the very best results in the majority of cases. Doubtless platinum has the majority over gum-bichromate; and I think this is as it should be. Probably platinum covers a wider range of negatives, and, on the whole, gives a wider latitude in results, than gum-bichromate. Its richness of tone and softness of texture add life, color and atmosphere—all supremely important qualities—to the print. No one who aspires to make first-class landscapes through a camera can afford to ignore platinum printing. This is a process which he *must* learn. He ought to become fully acquainted, further, with the modern methods of brush development, with the help of retarders; for this style of manipulation adds especially to the worker's command of atmospheric suggestion in the print; and that is the chief reason, perhaps, for which one should choose platinum. As to the gum-bichromate process, I have already had my word, in The Photo-Miniature No. 22, and the platinotype methods are given in The Photo-Miniature No. 7. At the present time there is no need of repeating more than that the gum method offers the largest possible opportunity for the worker to put his own feeling into his pictures,—to add his own ideas to the external composition which the camera saw,—to give his own personal interpretation of some fact or phase of the material world. At the outset of this essay it was insisted that landscape photography is properly an expression both of material facts and of personal feeling. Let us end by putting emphasis on the *feeling*.

---

*THE PHOTO-MINIATURE No. 10 is brimful of information concerning the blue print and its making.

Acknowledgment In the endeavor to illustrate worthily this number of The Photo-Miniature I have been embarrassed by the wealth of pictorial material placed at my disposal by the courtesy of many well-known workers. To those whose prints are herein reproduced, and especially to those whose work I had to put aside for lack of space, my thanks are given.

BOOKS

The number and variety of books treating of landscape necessitate their classification, which is here attempted for the guidance of the reader. The principal text books used during the past twenty-five years, written from the earlier point of view, are as follows:

Artistic Landscape Photography. By A. H. Wall. With illustrations from paintings and sketches, 172 pp. (English.) $1.50.

Composition, contained in Burnet's *Essays on Art*. Illustrated with numerous examples from the old masters; much quoted by Robinson, but strongly condemned by Emerson. (English.) $1.25.

Pictorial Effects in Photography. $1.50. *The Elements of a Pictorial Photograph*. $1.75. *Picture Making by Photography*. $1.50. *Letters on Landscape Photography* (Amer. edition). $1.50. *Art Photography in Short Chapters*. 50 cts. All by H. P. Robinson, and well worth reading except *Letters*, which I cannot recommend.

Photography Outdoors (No. 4 of THE PHOTO-MINIATURE Series). Illustrated. 25 cents.

From the modern point of view, and perhaps better for the fairly advanced photographer, may be advised:

Practical Pictorial Photography. By A. Horsley Hinton. In two parts. Illustrated by the author in a very helpful way. 50 cents per part.

Naturalistic Photography. By Dr. P. H. Emerson. 433 pp. Discursive, but valuable. $3.50.

A series of illustrated papers published in *The Photo Beacon* during 1900, entitled *Artistic Landscape Photography*. By John A. Hodges. These will be found extremely practical and helpful.

Two capital books, not dealing directly with landscape photography, but invaluable to the student, are:

Landscape. By Philip G. Hamerton. Price varies according to edition. And

Composition. By Arthur W. Dow. With many examples of the Japanese schools. $1.50.

ANTI-TRUST

PURE
COLLODION
PAPERS

MONARCH MATTE

MONARCH

TRADE MARK

MONARCH GLACE

RELIABLE
UNIFORM
PERMANENT

Three times quicker printing
than any other

MANUFACTURED ONLY BY THE

MONARCH PAPER COMPANY

E. & H. T. ANTHONY & CO.
SOLE TRADE AGENTS
122-124 Fifth Avenue
NEW YORK

ANTI-TRUST

Kindly mention The Photo-Miniature

NOTES

With this number The Photo-Miniature enters upon its third year, joyously pursuing the end for which it was made in the beginning, to wit: the happiness of all concerned. Characteristically, we celebrate the event by presenting an unusually attractive subject in a more than usually attractive way. To discuss landscape photography from the common-sense point of view is to look at a familiar use of photography in a new and profitable way. Let this number, then, set the pace for those to follow. Several extremely interesting monographs are in preparation for the coming months, and our third volume will, we believe, fully sustain the work already accomplished. May we all reach the success our work deserves—neither more nor less.

We have been asked to publish the year's programme in advance. This would stifle the pleasures of anticipation, and so we adhere to the custom of announcing in each issue what will follow in the next. Thus the May number of The Photo-Miniature will contain a simply written and fully illustrated guide to Telephotography. This is written for the man or woman who wants to know the uses of telephotography and how to go about it without overmuch learning or too great an expense.

N. B.—Busy or thoughtless readers who have not yet renewed their subscriptions, expiring at the end of Volume II, are here counseled to do this as early as possible, to avoid delay and disappointment.

❧

In this number, also, two other changes must be mentioned. First, the growth of the magazine and its allied interests makes necessary the securing of more working space. On and after the first day of May,

THE J. C. MILLEN
MANUFACTURING CO.

announce that

"Etching Matte"

will now be manufactured under the personal supervision of Dr. Millen, the inventor of this process. This guarantees an article of the highest standard, and the paper is offered to the photographic public with full assurance that it will give perfect satisfaction.

ETCHING MATTE is a pure Platinum Paper which requires nothing but cold water for its perfect development.

Full Literature, Price List, and Sample Print on request.

THE J. C. MILLEN
MANUFACTURING CO.

Denver, Colorado, U. S. A.

therefore, the offices of THE PHOTO-MINIATURE will be removed from 289 to 287 Fourth avenue, New York. By this change we double our present space and secure better working facilities, with cheerier workrooms. Second, we gratify a long-cherished desire to make the magazine more attractive to the reader's eye by setting its text-pages in fair Caslon type, for more than a century past esteemed as the plainest and easiest of types to read.

◆

The following numbers of THE PHOTO-MINIATURE have been reprinted during the past month: No. 16, *Bromide Printing and Enlarging* (2d edition, 8th thousand); No. 2, *The Pose in Portraiture* (4th edition, 11th thousand); and No. 4, *Photography Outdoors* (4th edition, 10th thousand). No. 7, *Platinotype Processes* (3d edition), is also reprinting, and will be ready about April 30.

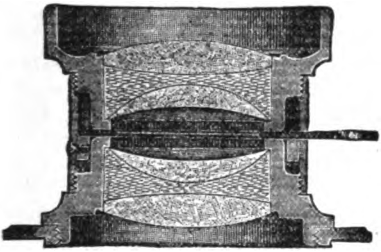
◆

The proud position sustained by Ohio in photography has already excited the world's comment and admiration. Mere mention of W. M. Hollinger, I. Benjamin, Miss Walbom, Clarence H. White and Miss Ema Spencer recalls the splendid work by which this position has been gained. Doubtless this success is due in part to the enthusiasm with which Ohio amateurs and professionals organize themselves for mutual help and encouragement. Witness the state professional association and its stirring conventions.

Down in Akron, Ohio, there is a camera club worthy of record. This club was organized ten years ago by the students of Buchtel College. Later, it was thrown open to the many skilled amateurs of the locality, and of late years has thriven prosperously. Its recent exhibition drew much good work from many outside states, and was gratifyingly successful. Its rooms are amply provided with every convenience for practical photography, enlarging, portraiture, etc.; and, best of all, its library brings before its members the principal photographic journals as published. In this way, and by fortnightly meetings with practical demonstrations

THE BEST UNIVERSAL LENS IS

THE GOERZ



DOUBLE ANASTIGMAT

Equally useful for indoor and outdoor work, having great covering power, superb definition, and the highest practical speed for instantaneous photography. Used by expert amateur and professional photographers in all branches of the art.

Every Goerz Double Anastigmat can be used in three ways:

As a lens of universal purpose (instantaneous views, portraits, groups, landscapes, architecture, etc.).

The back lens only for taking objects at a long distance double the size the whole lens would give.

As a high-class, quick-working wide angle for a size the diagonal of which is double as long as the focus of the lens.

Catalogue on Application

C. P. GOERZ

52 Union Square, New York

and discussions, its members are encouraged to put forth their best efforts.

◆

In the April number of *The Photographic Times* will be found a useful and charmingly illustrated paper on "Photographing Trees," by Mr. W. C. Baker, a gentleman who has charge of the department of drawing at Sibley College, Ithaca, N. Y. Mr. Baker is evidently in love with his subject, and his paper is well calculated to infuse the reader with a desire to go a-photographing trees, than which, by the way, there are few more delightful specialties.

Apropos of trees, we note that Mr. Cornelius Van Brunt, long famed for his exquisite photographs of the wild flowers of New York state, is to deliver an illustrated lecture on "Natural and Cultivated Trees, with Details of their Flowers and Fruit," before the Camera Club, New York, April 18. This should be well worth hearing and seeing, for Mr. VanBrunt does nothing "by halves."

◆

The Photo Club de Paris, whose annual exhibitions have been suspended for a year or two past, announces its sixth salon, which will be held at 44 Rue des Mathurins, Paris, during May. Readers of THE PHOTO-MINIATURE visiting the French metropolis should not overlook this exhibition or the club, both of which are unapproached by anything else of the kind in France. Unless we are in error, it was the salon of the Photo Club de Paris which suggested the London and Philadelphia salons, and the work seen on its walls is of the same high order.

◆

We record, with sincere regret, the death of Mr. Gottlieb Gennert, of New York, which took place early in March.

Mr. Gennert was perhaps the last, and most widely known, of the pioneers who entered the photographic trade while photography in America was in its infancy. When he began in business with his brother the daguer-

CRAMER'S
Isochromatic
Plates

ARE THE MOST PERFECT COLOR-SENSITIVE PLATES ON THE MARKET

◆

Made in Three Grades of Speed:
SLOW, MEDIUM and
INSTANTANEOUS

◆

For Sale by all Dealers in Photographic Supplies

◆

Manufactured by

G. Cramer Dry Plate Co.
ST. LOUIS, MO.

OFFICES IN
NEW YORK, No. 32 East 10th Street
CHICAGO, Room 705, Cable Building
SAN FRANCISCO, Room 38, No. 819 Market Street

Use Mallinckrodt's Sodium Sulphite Anhydrous
Absolutely Pure for Photographic Purposes

reotype was in its heyday, and the firm of Gennert Bros., of Maiden Lane, New York, became famous for their daguerreotype mats and other supplies. Later Mr. Gennert, alone, engaged in the importation of albumen paper and other European specialties. These he handled with so much enterprise and skill that the house he founded is today one of the most important in the trade. Latterly the management of the business has been left to his sons Maurice G. and Gustav C. Gennert, although Mr. Gennert retained its active oversight to the last.

Mr. Gennert was widely esteemed by his associates for his integrity and other sterling qualities, and will be sorely missed by all who knew him. In his home life he was one of the most lovable of men, always ready with good counsel and ripe experience, absorbed in the happiness and success of his children, to whom, with Mrs. Gennert, the scribe extends his respectful sympathy.

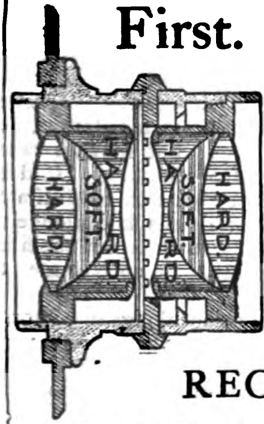
◆

Daintily printed, and otherwise interesting, comes a "Memorandum of prints shown at the rooms of the Klifa Club, Burlington, Vermont, by Mr. Frank A. Waugh, April 4 to 13." The list comprises thirty-three "photographs in water colors (monochromes)" made by the gum-bichromate method, and includes landscapes and trees, architectural sketches, portraits and figures, and a few plant pictures—the work of Mr. Waugh throughout. During the afternoon of the opening day, Mr. Waugh gave an informal description of gum-bichromate printing, so that the exhibition was educational as well as pictorial. The affair was numerously attended, and awakened considerable enthusiasm among the picture lovers of Burlington.

We wish that these "one man shows" could be given more frequently by our town and country clubs. There can be no question about their attractiveness, and they would give a desirable stimulus to the public interest in picture making by photography, as well as encouragement to the individual worker. The Klifa club is a woman's club, and is not directly concerned with photography.

TWO POINTS

First. Permanency



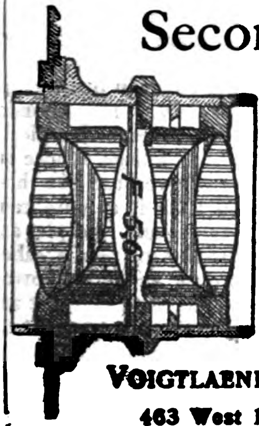
due to the correct position of the soft Jena glass, where outside influence cannot get at it

THAT

RECOMMEND

COLLINEAR LENSES *Series II*

Secondly. Speed



due to the large aperture and correct construction. Series II is the Ideal *Portrait, Group and High-speed Instantaneous Lens.*

When needing a lens, write to the

VOIGTLAENDER & SON OPT. CO.
463 West 14th Street, NEW YORK

Sometimes we are asked to look through a collection of prints, and to suggest a way by which their maker may improve the pictorial quality of his work out-of-doors. Few tasks are more difficult. As a rule the worker at this stage lacks, not in photographic manipulation, nor in his knowledge of the text-books, but in that other knowledge which comes only by observation. It does not seem to occur to the average man that an intimate knowledge of nature is as necessary as a knowledge of photographic technique in seeking to interpret the finer passages of nature by photography. So apt are men to confuse means and ends!

To those who aspire to these higher things in pictorial photography we commend the following passage from "Modern Painters," as suggestive that a man must know and appreciate the subtleties of nature's moods ere he can picture them. Says Ruskin (No. 66 La Riccia, near Albano):

"It had been wild weather when I left Rome, and all across the Campagna the clouds were sweeping in sulphurous blue, with a clap of thunder or two; and breaking gleams of sun along the Claudian aqueduct, lighting up the infinity of its arches like the bridge of chaos. But, as I climbed the long slope of the Alban mount, the storm swept finally to the north, and the noble outline of the domes of Albano and graceful darkness of its ilex grove rose against pure streaks of alternate blue and amber, the upper sky gradually flushing through the last fragments of rain-cloud in deep, palpitating azure, half æther and half dew. The noonday sun came slanting down the rocky slopes of La Riccia, and its masses of entangled and tall foliage, whose autumnal tints were mixed with the wet verdure of a thousand evergreens, were penetrated with it as with rain. I cannot call it color, it was conflagration. Purple, and crimson, and scarlet, like the curtains of God's tabernacle, the rejoicing trees sank into the valley in showers of light, every separate leaf quivering with buoyant and burning life; each, as it turned to reflect or transmit the sunbeam, first a torch and then an emerald. Far up into the recesses of the valley, the green vistas arched like the hollows of mighty waves of some crystalline sea,

2 NEW ONES
SEED'S
Landscape and Portrait
ORTHOCHROMATIC PLATES

The Landscape Ortho is an ideal plate for outdoor work. It is highly sensitive to yellow and green, and will commend itself to amateurs who desire color values. Used with or without a screen.

The Portrait Ortho is now used exclusively in many leading studios. It possesses all the qualities for which the 26 X and Gilt Edge brands are famous, besides its sensitiveness to color.

Both plates furnished in medium and extra rapid speeds.

Place orders with your dealer, or write us and we will see that you are supplied.

M. A. SEED DRY PLATE CO.

2005 Lucas Place, St. Louis, Mo.

NEW YORK, N. Y. : : 57 EAST 9th STREET

with the arbutus flowers dashed along their flanks for foam, and silver flakes of orange spray tossed into the air around them, breaking over the grey walls of rock into a thousand separate stars, fading and kindling alternately as the weak wind lifted and let them fall. Every blade of grass burned like the golden floor of heaven, opening in sudden gleams as the foliage broke and closed above it, as sheet-lightning opens in a cloud at sunset; the motionless masses of dark rock—dark, though flushed with scarlet lichen—casting their quiet shadows across its restless radiance, the fountain underneath them filling its marble hollow with blue mist and fitful sound; and, over all, the multitudinous bars of amber and rose, the sacred clouds that have no darkness and only exist to illumine, were seen in fathomless intervals between the solemn and orbed repose of the stone pines, passing to lose themselves in the last white blinding lustre of the measureless line where the Campagna melted into the blaze of the sea."

Thus Ruskin studied his subject before he chose or made the sketches which everywhere illuminate his books.

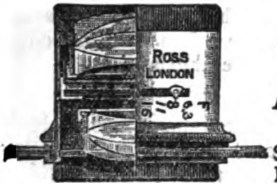
In this penetrative observation of nature lies the power of those who have delighted us with their transcripts of her beauty. The lesson herein taught is truly of more importance than the reading of many books about composition; for this observation so quickens and refines the sense of beauty in the mind, that the eye so trained instinctively selects and emphasizes those parts of the natural scene which best convey its sentiment—the spiritual or imaginative parts, which charmed or captivated the fancy.

❧

Judging by letters we have received, underexposure seems to be the chief difficulty experienced by beginners in gum-bichromate printing. One man got a perfect negative print after two hours' exposure in a poor light; another could not keep the film on its paper support, so got nothing for his pains. Follow the book! "Fifteen minutes *in direct sunlight* with a negative of average density," says The Photo-Miniature No. 22: *Gum-bichromate Printing*.

ROSS' LENSES

Used by Amateur and Professional Photographers in every part of the world. Every lens is carefully tested and may be purchased with confidence.



ROSS-ZEISS

CONVERTIBLE ANASTIGMATS

CONSISTING OF

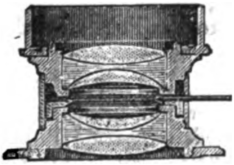
Single **Lenses..F/12.5**
Doublet**s.......F/ 6.3**

SETS FOR EVERY PURPOSE

These are undoubtedly the finest Single Lenses yet produced, both for Rapidity and Flatness of Field.

ROSS-GOERZ

DOUBLE ANASTIGMATS



These deservedly popular lenses have already an immense sale. They are the

Very Acme of Perfection

For full particulars see Catalogue

ROSS, LTD.

Manufacturing Opticians

111 New Bond Street, LONDON, W. ENG.

AND LEADING DEALERS EVERYWHERE

Dr. L. A. Weigel, of Rochester, N. Y., a specialist in radiography, has recently installed for his own professional use what is undoubtedly the largest and most perfectly equipped X-ray machine in America. His attention just now is concentrated on reducing the time of exposure which, in obtaining a radiograph of the human foot, he has already brought down to five seconds.

During his last hurried visit to New York, Dr. Weigel showed us a dozen good gum-prints, 6½ x 8½ inches in various colors, the results of his first attempts with this method after reading Photo-Miniature No. 22. Naturally, he is delighted with the possibilities of the process, and the quality of the prints was, indeed, well calculated to inspire him with enthusiasm.

◆

The *Photo Era* for April contains a profusely illustrated account (third paper) of "The Moki Snake Dance," by A. C. Vroman; a prose-poem on "April" in which the editor invites the gentle reader to "stand on the edge of spring," and catch things; and sundry advertisements of rye whiskey, corsets, garters, compounded antidote coffee, and other interesting items. Price, 15 cents per copy, and a bargain at the price. [Photo Era Pub. Co., Boston.]

◆

The *Photo Beacon* for April is an exceptionally good number, interesting in its reading matter and beautifully printed, so that its illustrations really reproduce the fine originals. Mr. J. H. Vanderpoel continues his useful papers on "Portrait Posing;" Alfred Watkins introduces his series of articles on "Development;" and James F. Ryder gives pen-pictures of his early experiences in portraiture. Among the advertisements we find the following:

> **MATRIMONIAL.**—Photographer in far Western State, widower, aged 40, 5 feet 8 inches in height, weighing 160 pounds, good looking, brown curly hair, blue eyes, good natured and full of fun, who does not smoke, drink or gamble, wants a wife not over 35 years of age; preference to one of good figure, not over 150 pounds weight; no objection to a widow with not more than one child. Apply W. I. D., care of PHOTO-BEACON.

LEADING DEVELOPERS

METOL The quickest and most energetic of developer
Oz., 75c.; lb., $10

ADUROL Best for intensity and contrast
Oz., 60c.; lb., $8.50

ORTOL Clear and free from fogging; excellent for developing papers
Oz., 75c.; lb., $10

PYROL Improved form of Pyrogallol, clean, compact, easy to handle
Oz., 30c.; lb., $4

HAUFF

◆

G. GENNERT
Trade Agent
NEW YORK

Our erstwhile scientific contemporaries are fast becoming irresistible in their efforts to satisfy the inward and outward as well as merely photographic cravings of their readers.

❧

A very useful device for shading the lens during exposure, which we should have had years ago, has been introduced by the Jackson Lens Shade Company, Jackson, Michigan. This is a small, but well-made attachment, adjustable to any lens up to 5x7 inches or box (fixed focus) camera, and in any desired position, effectually screening the lens. Its usefulness in photographing in sunlight or outdoors generally, in interior or flashlight work where troublesome reflections are encountered, will be readily appreciated. The instrument has a graduated scale showing how far it may project without cutting off the light with any particular lens. At the nominal price asked for it (fifty cents) the attachment should find a place in every amateur's equipment.

❧

The April *Photo Ticker* is out, and everyone who can enjoy a breezy photographic journal should send for a copy. It is published by W. P. Buchanan, 1226 Arch street, Philadelphia, for free distribution, and, although largely devoted to the advertisement of his specialties, contains many items which should not be missed. The prices in the bargain list are remarkable.

The *Ticker's* remarks anent photographers' conventions "touch the spot" in caustic fashion, but were sadly needed. They will be applauded by professionals from one end of the country to the other.

❧

Mr. Thomas Manly, the inventor of the ozotype printing method, sends us a pamphlet "Lessons in Ozotype," forming a simple introduction to this process. The advantages of ozotype over the ordinary carbon process are stated as follows: "Ozotype gives a distinctly visible image instead of having to use an actino-

THERE ARE NOW IN USE OVER

234,000 LENSES

manufactured by
the Bausch & Lomb Optical Co.

This enormous number represents only Bausch & Lomb-Zeiss Anastigmat, Rapid Universal, Alvan G. Clark, Rapid Rectilinear, Portrait, and Wide Angle Lenses, and does not include the millions of simpler photographic lenses produced.

THE POPULAR VERDICT, as expressed by actual purchase and use, is that our lenses are practically WITHOUT A RIVAL.

OUR PRODUCTS ARE OBTAINABLE FROM ALL DEALERS

CATALOGUE FREE

Bausch & Lomb Optical Co.
ROCHESTER, N. Y.

NEW YORK CITY
Broadway and 28th St.

CHICAGO
State and Washington Sts

Kindly mention The Photo-Miniature

meter. There is no reversal of the image with regard to right and left, as in carbon printing, and therefore no transfer is necessary. No 'safe edge' on the negative is required, and the fingers do not come in contact with a bichromate salt in any of the operations.

"The sensitizing solution will keep indefinitely, and is not sensitive until spread on the paper and dried. The pigment plaster is not sensitive and also keeps indefinitely without deterioration. The operations may be carried out in convenient stages as desired; the initial print may be made, and the pigmenting be done at any convenient time afterwards. The materials are not affected by extremes of temperature and work in hot or cold climates without difficulty."

Mr. George Murphy, 57 East 9th street, New York, the agent for ozotype supplies east of the Rocky Mountains, hopes to have a full line of the materials needed in hand by the time these pages reach our readers.

❧

The amateur photographers of Seattle, Wash., are trying to organize an amateur photographic club. This should not be difficult in a thriving community like Seattle. Communications from those interested should be addressed to Mr. O. P. Anderson, care Anderson Supply Company, Seattle, Wash.

❧

N. Watry, Chicago, announces that he has associated with him in his business Mr. Emil M. Heidkamp, and that the firm name will hereafter be N. Watry & Co., 99 E. Randolph St., Chicago.

Messrs. Watry and Heidkamp are well and favorably known among Chicago amateur photographers, and we take this opportunity to further commend their services to our readers, with our best wishes for their continued success.

❧

Dr. Caspar W. Miller, as librarian of the Photographic Society of Philadelphia, 10 South 18th St., Philadelphia, has published a printed list of duplicate

Trade Mark

Actien-Gesellschaft für Anilin-Fabrikation, Berlin S. O.
Photographic Department

Manufacturers of:

IMOGEN, Patent Developer

IMOGEN is well suited for the modern highly sensitive plates.
IMOGEN works clearly and brilliantly.
IMOGEN produces all the gradation, from density to fine detail, the resulting negatives being therefore of the highest grade.
IMOGEN is not much affected by ordinary variations in temperature.
IMOGEN does not injure the fingers.
IMOGEN answers very well for "stand-development,"

for development of lantern slides
" " of diapositives on gelatine-bromide plates
" " of bromide papers, etc.

1 oz.	4 oz.	8 oz.	16 oz.
$ —.37	1.20	2.10	3.95

Agfa-Intensifier

Patented. Name protected

A One-Solution Intensifier. Only to be diluted with ten parts of water.
Keeps indefinitely.
Complete intensification in one manipulation takes about ten minutes.

4 oz.	8 oz.	16 oz.
$ —.60	1.—	1.75

Agfa-Reducer

Name protected. Patent applied for

A permanent dry powder.
Unequaled in simplicity. Only to be dissolved in 10 parts of water.
Complete reduction takes about five minutes.

$—.80 per original bottle of 4 oz. with screw-lid and hollow glass-stopper, serving as measure
$1.— per box of ten glass-tubes containing ten grammes each

Sold by all Dealers

EIKONOGEN. ★ AMIDOL.

RODINAL. ★ DIOGEN.

Kindly mention THE PHOTO-MINIATURE

photographic books and magazines offered for sale by the Society. Readers desiring to complete their files or obtain early works on photography should ask for a copy of this list, which Dr. Miller will send on receipt of stamped, addressed envelope.

◆

The Photogram, Ltd., has removed its editorial and advertisement offices from 6 Farringdon avenue to Effingham House, Arundel St., Strand, London.

Messrs. Dawbarn & Ward, Ltd., publishers of *The Photogram* and agents for THE PHOTO-MINIATURE in Great Britain, have enlarged their space at 6 Farringdon avenue, London, E. C.

◆

The Voigtlander & Son Optical Company, 467 West 14th street, New York, ask us to announce their "Offer of Prizes to Users of Collinear Lenses," a competition, with cash prizes, which closes May 5. Particulars may be had on application to the address given. Unfortunately, the announcement reached us too late for our March issue and can hardly be effective now.

◆

A Correction.—Will our readers please note that the correct address of Mr. Minott M. Govan, dealer in photographic supplies, is 6 West 15th street, New York, and not 16th street, as given in our last number.

◆

A novel application of photography for reproducing records has recently come to our notice. An insurance company has adopted the practice of pasting or permanently attaching to each policy, when issued, a facsimile copy of the "application" made for the policy, showing the conditions, answers, etc., of the applicant as given to the agent, and upon which the policy is based. The difficulty and expense of obtaining absolutely true copies of these "applications" caused the company to investigate as to whether photog-

ROTOGRAPH PAPER

MADE IN FIVE GRADES

Glossy	*Matt*
A—Thin	**C—Thin Smooth**
B—Thick	**D—Thick Smooth**
	E—Thin Rough

NOTE—PRICES THE SAME FOR ALL GRADES.

Rotograph Paper is a regular Bromide of Silver Paper, exposed usually by artificial light and developed in the dark-room the same as a dry-plate or film. It possesses great latitude of exposure, so that the waste is scarcely a factor, has no tendency towards staining and yields results that can scarcely be distinguished from a real platinum print.

The following unsolicited testimonials attest its merits, and the originals will be cheerfully shown to those desirous of seeing them:

"Bromide paper received and will say it is the finest I ever used."

"A very rapid printer and does not turn yellow by over-developing, which is greatly in its favor."

"It is astonishing what latitude in developing the paper has."

"I must say I am extremely delighted over the results I obtained using your paper for X-Ray work."

SPECIAL NOTICE

In localities where dealers do not handle the goods, we will deliver orders free of express charges to the customer provided proper amount, as per our revised price-list of January 8, is forwarded with the order.

Samples: In 4 x 5 size, including all our grades of paper, as well as sample prints on glossy and smooth surface, will be forwarded to any address on receipt of 10 cents.

NEUE PHOTOGRAPHISCHE GESELLSCHAFT, A. G.
B. RUSSEGGER, Selling Agent
7 West 14th Street NEW YORK

raphy could not be made to do the work more cheaply and perhaps more accurately. An amateur photographer on the company's staff took the matter in hand, after several professionals had given the problem up. To provide bromide paper copies of the "applications" was not practical, inasmuch as this would require a negative, and then the bromide print was too heavy to neatly attach to an insurance policy. The various manufacturers of bromide paper were appealed to in vain for a substitute. At last, the wit of a woman solved the difficulty. Why not coat thin paper with a gelatine emulsion and obtain a reversed positive print by direct copying with the camera, just as if one made a negative, with the glass side next to the lens. This expedient was tried and proved perfectly successful. A friendly dry plate manufacturer coated sheets of the thin blue bond paper, regularly used by the insurance company for "applications," with a dry plate emulsion. This sensitized paper was placed between two thin sheets of glass in an ordinary plate holder, the sensitive film turned away from the lens. The camera was then set up facing the "application" to be copied, and carefully focused. The slight adjustment necessary to allow for the thickness of the glass in front of the sensitive paper was then made and an exposure of forty seconds was given, the copying being done in a fairly well lighted room. Development gave a clean, black, positive copy on light blue paper, absolutely plain in every particular, and just of the right thickness to paste upon and form part of the policy. The one difficulty in the case apparently is that the dry plate manufacturer charges a somewhat exorbitant price for the sensitive paper.

◆

The Harvard Camera Club, attached to Harvard University, is about to lose one of its most active workers by the graduation of Mr. Walter B. Swift, who has for two years past held the office of president of the club. Mr. Swift is an enthusiastic disciple of H. P. Robinson, and has given much time and pains to the development of pictorial photography among the ama-

THE PLATES TO USE
wherever color is concerned, but especially

FOR LANDSCAPES

where the delicate values of foliage are to be kept and for

TELE-PHOTOGRAPHY

where clearness is desired in the long-distance view and

FOR ALL OUTDOOR WORK

LOVELL
COLOR DIFFERENTIATING
PLATES

May be had "backed" on request in two speeds
C.D. "FAST" and C.D. "MEDIUM"

Positively the best orthochromatic plates in the market. Sensitive to the entire spectrum; giving brilliant negatives; simple in manipulation. A trial will convince.

OBTAINABLE FROM DEALERS OR DIRECT FROM FACTORY
SEND FOR PRICE-LIST AND SPECIAL CIRCULAR

LOVELL DRY PLATE MFG. CO.
NEW ROCHELLE, N. Y.

Western Depot: 64 Wabash Avenue, Chicago.
Denver: Hart Bros. & Wells.

Kindly mention THE PHOTO-MINIATURE

teurs attending the university. The growth of the club, its successful annual exhibitions, art lecture courses and the like testify to his well-directed energy, and he will be a difficult man to replace.

◆

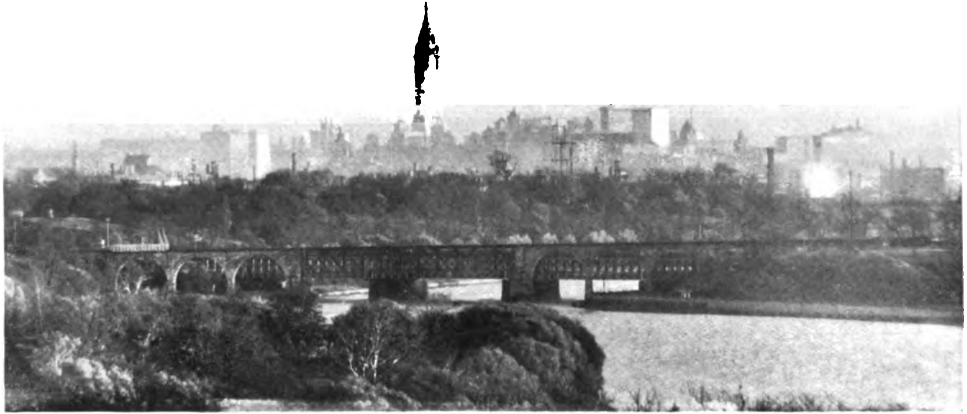
H. A. Hyatt, St. Louis, Mo., who has recently acquired the photographic stocks of the Meyer Drug Company, and another concern, sends us a bargain sheet announcing a "Special Cleanout Sale." The prices attached to new goods, cameras, etc., in this list fully justify Mr. Hyatt's assertion that "cost or first prices cut no figure in this sale."

◆

Mr. H. A. Collings, Holyoke, Mass., favors us with a copy of the 1901 roster of the members of the Photographic Association of New England, from which it would appear that this flourishing association has gathered into its ranks every New England professional known to fame or fortune. The fifth annual convention of the association will be held at Copley Hall, Boston, August 28, 29 and 30, under the leadership of Mr. George H. Van Norman, one of the most skilful of latter-day portraitists and a delightful man to meet and know.

◆

We have received from E. & H. T. Anthony & Co., New York, samples of the new collodion print-out papers (Crown Brand), for which they are trade agents. In our tests with these papers we find them quick printers as claimed, and capable of giving excellent prints with ordinary care in manipulation. With the usual gold bath we obtained rich color and clean gradations; by toning with platinum solution we secured soft warm black tones approaching carbon effects.



THE HEART OF PHILADELPHIA, FROM BELMONT, 3½ MILES AWAY

Upper left-hand picture made with a lens of 14-in. focus. Upper right-hand picture made with a 7-in. combination.

Frank S. Dobbins

The Photo-Miniature
A Magazine of Photographic Information
EDITED BY JOHN A. TENNANT

Volume III MAY, 1901 Number 26

TELEPHOTOGRAPHY

There are, perhaps, many who will question the timeliness of this little book about telephotography, on the ground that those interested in the subject are not yet sufficiently numerous to justify a number of THE PHOTO-MINIATURE being devoted to its discussion. But I plead for a broader point of view. We cannot forever linger in the kindergarten of photography and must, sooner or later, renew and enlarge our interests by excursions to fresh fields and pastures new. This, indeed, is the avowed purpose of THE PHOTO-MINIATURE as a magazine of photographic information: not merely to deal with things already known, but more especially to open up the less familiar or neglected fields of photographic work, wherein the reader may find pleasure or profit according to his need. I am confident that the intelligent photographer will support me in this, and not withdraw his interest because THE PHOTO-MINIATURE ventures now and again beyond the well-worn ways of everyday photography. This being agreed to, let me assure the faithful that a leisurely devotion to what follows will show that telephotography is something about which we should be well informed, and that it offers to amateurs and professional alike practical usefulness and many interesting possibilities.

Telephotography belongs to our own time. It was foreshadowed so long ago as 1834 by Peter Barlow, an astronomer, but the suggestion he offered has been developed only within the past ten years. The honor of making known the first practical system of telephotography is generally ascribed to Mr. Thomas R. Dallmeyer, but Dr. Miethe and Duboscq brought forward similar inventions about the same time, 1890-92. Those who keep in touch with the progress of photography have, therefore, more or less acquaintance with our subject, especially with its theoretical aspects. But it cannot be said that photographers generally have an intelligent appreciation either of the significance or uses of telephotography. With the notable exceptions of Mr. Dallmeyer's comprehensive treatise, Dr. Rudolph's monograph, and a few scattered papers by Mr. Marriage and others, there has been a strange lack of plain and practical information concerning the whole subject. This, I hope, will be supplied in part by the monograph here offered. If it awakens a livelier interest in the many applications of the telephotographic lens, my purpose will be accomplished, and the gentle reader will have one more field for his photographic activities.

What do we mean by telephotography? The literal translation of the term, i. e., distance photography, although commonly accepted, is inadequate, and does not tell the whole story. Telephotography signifies more than the photographing of distant views or objects. Unfortunately, it is not possible to put a self-explanatory definition into a couple of words. We shall be obliged to look into many things before we arrive at the true inwardness of telephotography. This is part of the excursion! As reward for our patience we will incidentally quicken our knowledge of a few points exceedingly helpful in our everyday work.

A Definition

Plainly described, telephotography covers the use of a special form of the photographic lens by which, with a camera having the usual limited bellows extension, we may obtain, *first:* larger and more perfectly defined images of distant objects than are possible with ordinary lenses; and *second:* a more perfect rendering of the "drawing," or perspective effects in large direct photographs of comparatively near objects, as in portraiture, or objects presenting unusual "depth of field," such as exposition buildings, an avenue of trees, cathedral churches, bridges, and the like. This is a long-winded definition, but if we read it again we will see that it promises definite improvements in photographic practice not otherwise obtainable.

The Telephotographic Lens

The special form of lens required is known as a telephotographic lens. As all telephotography is based on the peculiar properties of this special lens, we must know something of its construction and advantages. Briefly, the telephotographic lens is simply a long-focus lens (or battery of long-focus lenses in a single instrument), which may be used with a camera of short bellows extension. To those familiar with the important advantages offered by long-focus lenses, and the disadvantages of their great cost, lack of portability, etc., this description will suffice to awaken interest. The majority of photographers, however, know little about the comparative value of long- and short-focus lenses. The amateur who, as a rule, knows nothing beyond the "fixed-focus" box and extremely portable folding camera with minimum bellows extension, cannot be expected to appreciate the difference between a lens of 9 inches and another of 23 inches focal length. Hence we must go back, for a few minutes, to the lens kindergarten. No mathematics or optical formulæ need worry us, however; just a few plain facts about lenses and images, such as we had in The Photo-Miniature, No. 1: *Modern Lenses.*

Focal Length

The first thing we want to know about a lens is its focal length. We will know why presently. Roughly speaking, in rectilinear or doublet lenses, the distance between the diaphragm and the ground-glass when a distant object is sharply focused, is said to be the focal length of the lens. Correctly determined, however, it is the distance between the ground-glass and the optical center of the lens under similar conditions. The significance of the distinction will be apparent later.

Size of Image

The scale or size of the image we get in our photograph of any object is determined by two factors, viz.: (1) the distance between the object and the lens; and (2) the focal length of the lens. From this we see that wherever it is impracticable or undesirable to vary the distance between camera and subject (as in photographing birds on their nests, deer at a stream, buildings which cannot be included on the plate from a close range, inaccessible architectural details, etc.), we are completely dependent on the focal length of the lens, as far as size of image is concerned. Hence the practical importance of focal length in a lens.

Varying the Size of Image

As far as distant objects are concerned, the size of the image varies in exactly the same ratio as the focal length of the lens used. Thus if we photograph a house and its surroundings with a 5-inch lens and get an image 1 inch high, we know that a 10-inch lens will give us a 2-inch image from the same point, and so on, the size of the image increasing or decreasing as we use lenses of greater or less focal length. Unfortunately, every increase in the focal length of the lens involves a larger lens (increased cost) and greater bellows extension in the camera. Thus we realize that, in certain circumstances, photography with ordinary lenses has its shortcomings and limitations.

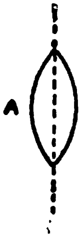


Fig 1

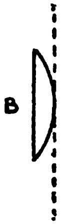


Fig 2

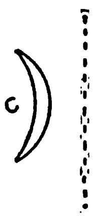


Fig 3

Focal Length and "Drawing"

Similarly the professional worker, in making large direct portraits in the studio, finds it impossible to get correct "drawing" or perspective effects in his portraits because of lack of focal length in his lens. This obliges him to approach his sitter too closely, thus photographing at too great an angle, the result being distortion. Upon investigating the difficulty he may find that, apart from the increased cost of a lens of longer focus and the greater bellows capacity needed in his camera, the limited length of the studio will not permit the use of a lens of the requisite focal length. This difficulty is much more common than is supposed. If we examine much professional work of this class we will see that the distortion arising from the use of lenses of too short focus is its principal fault.

Length of Focus and Camera Extension

The telephotographic lens, by its peculiar construction, enables us to cope with these real difficulties in a wholly satisfactory way, providing, as it does, a long-focus lens at a moderate cost, which will work with the normal bellows extension found in the majority of cameras. The focal length of the telephoto combination is, moreover, variable at will within certain limits, thus giving us facilities for altering or controlling the scale of the image as desired.

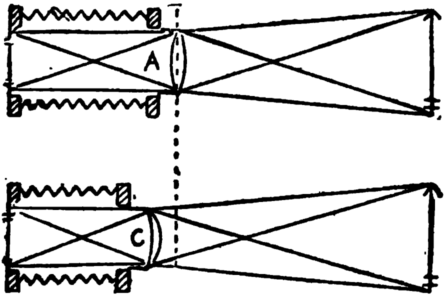


Fig 4

Telephoto Principles

How does the telephotographic lens accomplish these desirable improvements? We must look at its construction. For convenience' sake, the diaphragm is generally accepted as the optical center of a lens in determining its focal length. But, as a matter of fact, the optical center changes its position according to the shape or curvature of the lens. Thus, in Fig. 1, a double-convex lens, the optical center lies within the lens itself. In Fig. 2, a plano-convex lens, the optical center lies on the front surface; and in Fig. 3, a meniscus lens, it is completely outside the lens itself.*

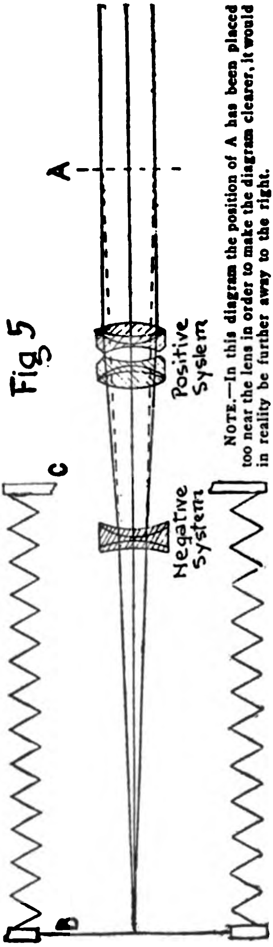


Fig 5

NOTE.—In this diagram the position of A has been placed too near the lens in order to make the diagram clearer, it would in reality be further away to the right.

The Optical Center of a Lens Now let us consider two lenses identical in focal length, but differing in their curvature, one a double-convex as in Fig. 1, the other a meniscus, as in Fig. 3. These lenses will give images in which the objects are identical in size, and yet, owing to the position of the optical center in the two lenses, the double-convex lens, A, will be further away from the plate than the meniscus, C. Fig. 4 makes this quite clear, and shows that, as a consequence, the camera extension for a lens of a construction similar to C will be less than one constructed like A.

Its Displacement The variation in the position of the optical center in simple lenses is not very marked, but the analogy is useful in helping us to understand the telephoto lens, which is a combination of lenses so arranged that the optical center lies at a great distance in front of the lens itself, as we see in Fig. 5. In this diagram, A is the plane of the optical center; B represents the plane where the picture image is formed. The distance AB is therefore the focal length of the combination. C is the plane in which the camera front lies; and CB represents the bellows extension necessary to use a telephoto lens of a focus equal to AB. In order to obtain the same result (or an image of the same size) with an ordinary lens, a camera extension equal to AB would be necessary. Thus, by this arrangement we are enabled to use a lens of great focal length with a comparatively short camera extension.

---

* For these diagrams and the happy explanation of the principles underlying the construction of the telephotographic lens I am indebted to an interesting booklet, "Practical Notes on Telephotography," just published by R. & J. Beck, Ltd., London. Price, 6d.—*Editor.*

Positive and Negative Lenses

Now we may go a step further. As most of us know, the primary lenses used in the manufacture of photographic objectives are classified as *positive* (converging) and *negative* (diverging) lenses. The ordinary lenses used by photographers are *positive* lenses, so called because they are capable of producing positive or real images of objects. Fig. 6 shows a simple positive lens, the image being formed at F, the normal focus of the lens. Negative lenses, on the other hand, are incapable of producing a real image, and are said to have only a virtual or imaginary focus. This is explained in Fig. 7. If we place a piece of black cardboard, pierced with three small holes, in front of a negative or concave lens, the pencils of light passing through the holes will be diverged or bent outward, as

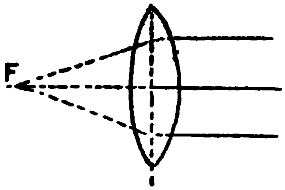


Fig 6

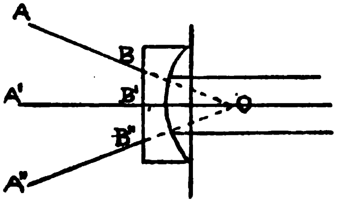


Fig 7

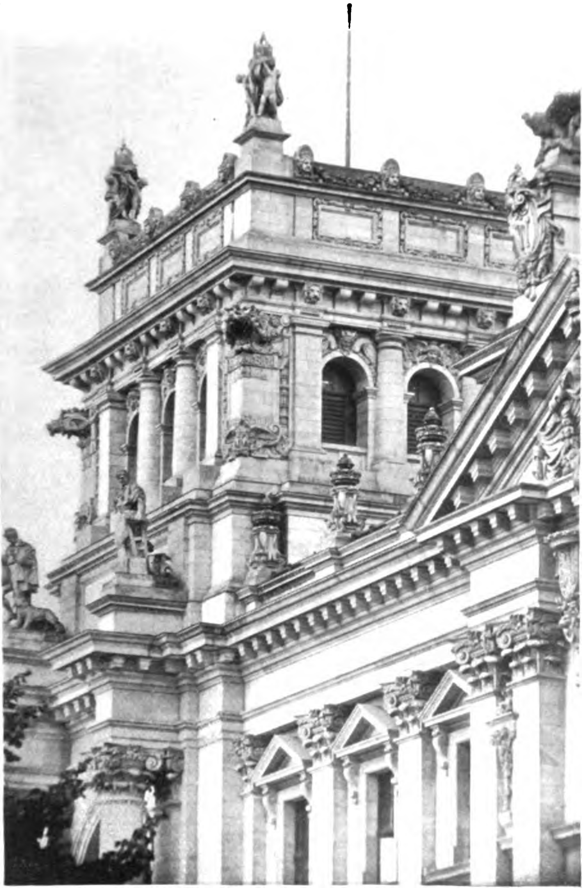
BA, B′A′, and B″A″, and will appear as if they proceeded from the point O, which is therefore called the virtual or negative focus of the lens.

The Telephoto Combination

The peculiar construction of the telephotographic lens can now be explained. In the ordinary telephoto objective we have, in a single tube, a positive lens (usually an ordinary anastigmat or rapid rectilinear) which forms the image, and a negative lens placed at such a distance from the positive that it intercepts the image formed by the positive lens. The addition of this negative lens to the positive effects: (1) a considerable extension of the focal length of the entire telephoto system as compared with the focal length of the positive lens alone, thus insuring a corresponding enlargement of the image*; and (2) it displaces the initial point of the focal length of the combination (marked A in Fig. 5) to a point considerably in front of the ordinary or positive lens. The consequence of this displacement is that the telephoto combination requires a much shorter camera extension than would be necessary with an ordinary lens of equal focal length.

A Typical Example

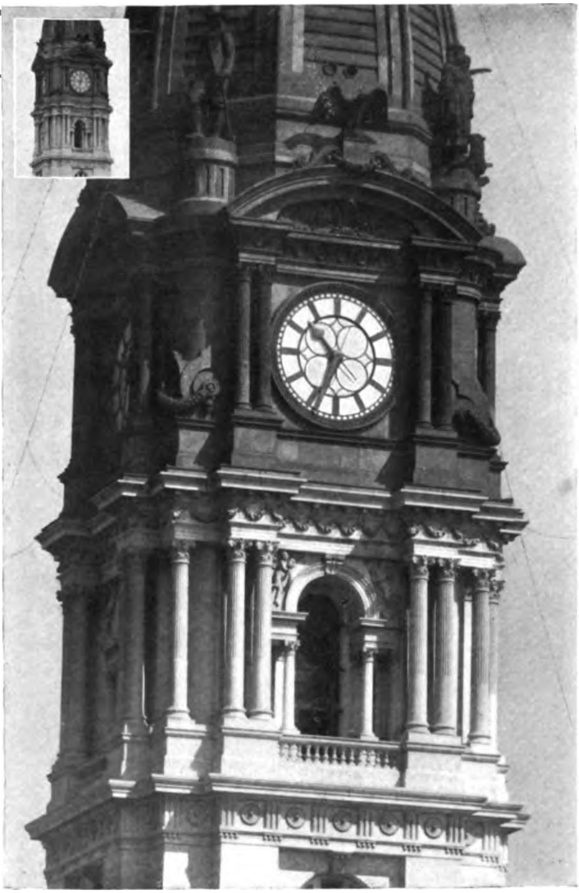
In Fig. 8 we have a diagram of the Steinheil telephoto objective, wherein are combined a Steinheil Antiplanatic lens working at *f/7* and, at the right-hand end of the tube, a negative lens. This combination, which may be taken as typical, is adjustable to produce images enlarged or magnified to 3, 5, 8, or 10 diameters as compared with the image given by the Antiplanat alone. The focal length of the combination when adjusted to give a magnification of 3 diameters, is $21\frac{11}{16}$ inches, requiring a bellows extension of only $7\frac{1}{8}$ inches. By adjusting the sliding mount focal lengths of $36\frac{1}{4}$ inches (extension of bellows $12\frac{1}{4}$ inches); 58 inches (bellows extension $18\frac{1}{2}$ inches); and $72\frac{1}{2}$ inches (bellows extension $24\frac{7}{16}$ inches) are obtained. It will be observed that all these degrees of bellows extension are provided in the compact long-focus cameras now so much in evidence for 5 x 7 plates. For general work, where magnifications of 3 or 5 diameters will be sufficient, the ordinary hand or stand camera offers ample bellows extension, although



AN EXAMPLE OF THE USE OF THE TELEPHOTO LENS

In photographing inaccessible architectural detail. Combination consisting of Zeiss Series VII^{a}, No. 8, and Tele-negative System of 3-in. focus.

Dr. Paul Rudolph



TOWER OF CITY HALL, PHILADELPHIA

From a point 1,000 feet distant. The small picture was made from same point with the positive lens alone, without telephoto attachment.

FRANK S. DOBBINS

we shall see how to lengthen this temporarily on another page. It should not be overlooked that in the telephoto objective we have not one only but several lenses of varying focal length, which will often be found advantageous.

Telephoto Attachments

While complete telephotographic lenses are readily obtainable, the combinations in general use are usually formed by adjusting a "telephoto attachment" to an ordinary anastigmat or rapid rectilinear already possessed by the photographer. Any good photographic lens working at *f*/8 or larger aperture may be converted into a telephoto objective by the simple addition of a suitable "attachment" containing a negative lens. As the addition of the telephoto attachment decreases the rapidity of the entire combination, it is obvious that, for portrait work or otherwise where rapidity is of importance, the positive system should work at as large an aperture as is possible. Hence a telephoto attachment, adjusted to a portrait lens working at *f*/4, offers advantages not obtainable with a telephoto lens whose positive has *f*/8 as its largest opening. As any defects or dirt on the positive are magnified with the image as the result of the addition of the negative lens, it follows that the better the quality of the positive the better will be the telephoto combination. By combining, in this way, an ordinary photographic lens with a negative lens attachment we get a telephoto objective at a much lower cost than the purchase of

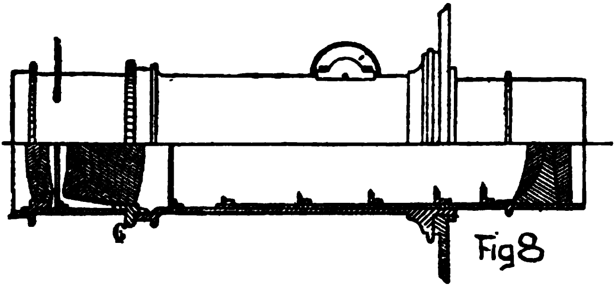
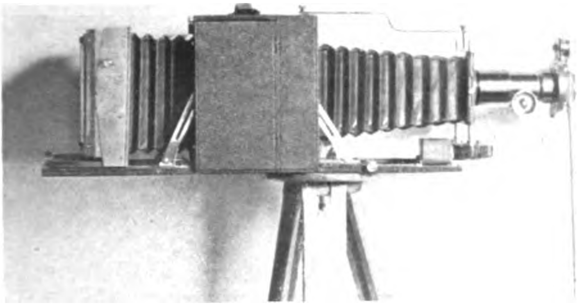


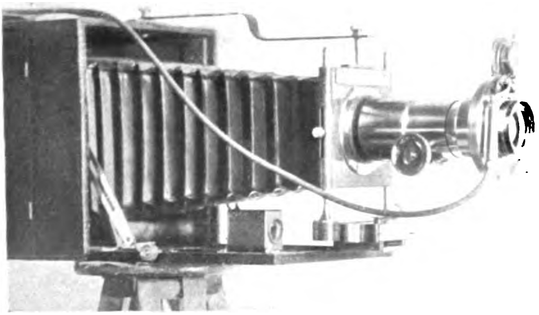
Fig 8

a complete system. The ordinary or positive lens is, of course, removable from the attachment at will when required for general purposes.

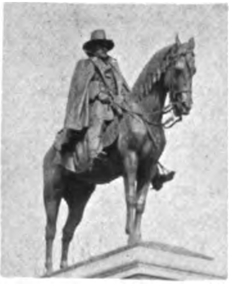
A Description

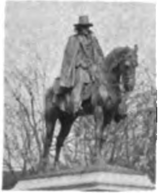
The telephoto attachments in the market are all more or less alike. A description of one will therefore suffice for all. The ordinary telephoto attachment, such as one would select for use with a positive lens having an equivalent focus of seven inches, to cover a 4 x 5 plate, consists of a brass tube about 2 inches in diameter and 4 inches long. It is capable of an extension of about 2 inches by means of a small rack and pinion or screw adjustment. On the inner sliding tube a scale of magnifications is marked by the lensmaker, indicating the separation of the lenses for the magnifications proper to the entire combination. The front end of the attachment is threaded to receive the positive lens with the exposure shutter, and at the rear end of the attachment is placed the negative lens. It is always advisable to send one's shutter and positive lens to the lensmaker in getting a telephoto objective so that he may adjust it mechanically and optically to the attachment. This insures that the markings or scale of magnifications will be correct. Between the negative and positive lenses certain partitions are placed to cut off reflected light. With the little hand-camera telephoto attachment there is no screw adjustment, but simply a neatly fitting sleeve arrangement, quite effective for its purpose. The tube of this attachment is 1⅜ inches in diameter, 2⅝ inches long. It has an extension of three-quarters of an inch. The negative lens of a telephoto attachment is usually one-half the focal length of the positive lens with which it is to be combined. Thus, if the positive system has a focus of 7 inches, and 3½ inches from it is placed a negative lens with a virtual focus of 3½ inches, the image, instead of coming to a focus at a distance of 7 inches from the positive, is intercepted by the negative lens and carried back about 24 inches. By increasing the separation of the positive and negative lenses we diminish the focal length of the combination and thus reduce the size of the resultant

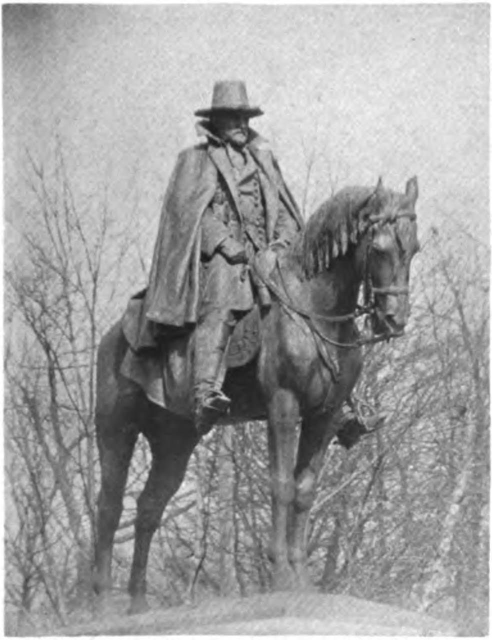




CAMERA WITH TELEPHOTO ATTACHMENT AND POSITIVE (ANASTIGMAT) LENS







GRANT MONUMENT, FAIRMOUNT PARK, PHILADELPHIA

Upper right-hand picture made with an ordinary lens from same point as the telephoto view. The upper left-hand picture shows the distortion resulting from an attempt to get a large image by approaching closer to the subject.

FRANK S. DOBBINS

image. Separating them about one-sixteenth of an inch, for instance, reduces the image from an eightfold to a sevenfold magnification. Another one-tenth of an inch further apart brings it down to a sixfold magnification; another one-eighth of an inch produces a fivefold magnification, and so on. Of course, these figures are true only with an attachment combining a 7-inch positive lens with a 3½ negative lens. There is a mathematical rule for these distances of separation, but we can most conveniently follow the scale engraved on the attachment by the optician. Whether this or that magnification is possible depends not only on the power of the telephoto attachment, but also on the bellows extension of the camera. We have seen that the telephotographic lens is simply a series of long-focus lenses, and we know that the longer the focus of the lens we use so much the longer must be the bellows extension of the camera. In some cases we can temporarily gain the degree of bellows extension needed, in others we cannot.

The Camera

As to the camera: by this time it will be plain that to secure the highest possible magnification with any given combination of positive and negative lenses a certain amount of bellows extension is necessary. This is easily calculated by the following rule: *To find the camera extension necessary for any given magnification, multiply the focal length of the negative lens by the number of magnifications less one.* For example: We have a negative lens of 3½ inches focal length, to be combined with a 7-inch positive, and require an eightfold magnification; how large a camera extension do we need, i. e., how long must the distance be from lens-board to ground-glass? Multiply 3½ by 7, and we get 24½ inches. This may vary a trifle, according to the precise location of the negative lens in the brass tube. I insert here a table prepared by the Bausch & Lomb Optical Company showing the distance required by the various combinations. Similar tables are furnished by all the manufacturers of telephoto lenses. Note that the focal length of the negative lens is simply the difference between any one magnification and the next to that.

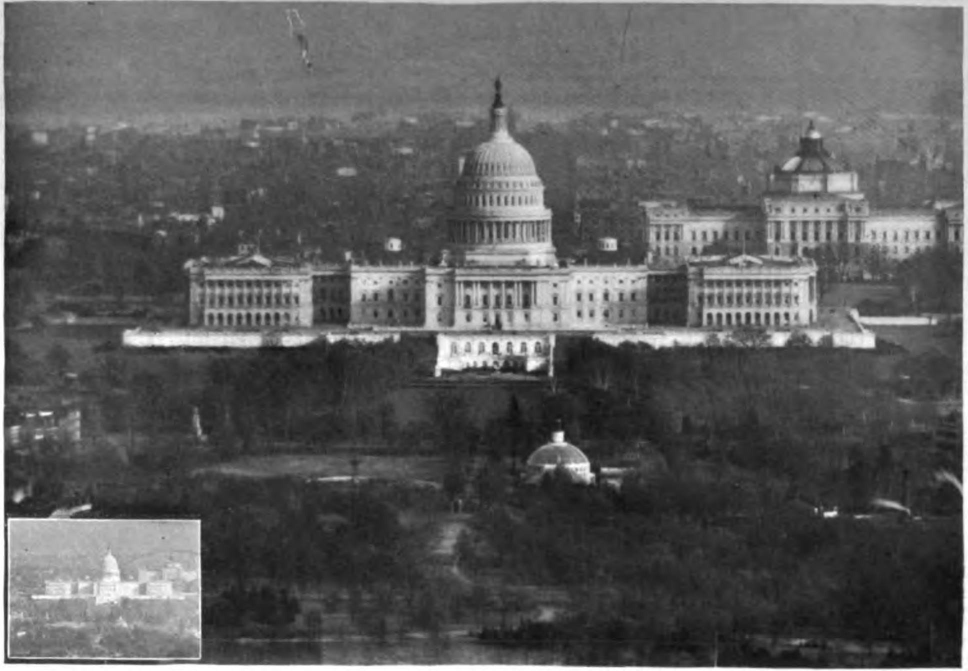
DISTANCE FROM THE FRONT BOARD TO THE GROUND-GLASS

Size	Equivalent Focus of Photo Lens	Magnification Resulting Focus when used with Telephoto Attachment					
		3	4	5	6	7	8
Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches
4 x 5	6½	6⅝	9⅝	12⅞	16⅛	19⅜	22⅝
5 x 8	8¾	8½	13	17½	22	26½	31
6½ x 8½	11½	10½	16½	22½	28½	34½	40½
8 x 10	13½	13½	20½	27½	34½	41½	48½

To Find the Magnification And so conversely if we wish to find the magnification for the purpose of ascertaining the necessary exposure (which depends on the degree of magnification) we have the following rule: *Divide the camera extension by the focal length of the negative lens and add one.* For example: we find, on measurement, that the distance from the lens-board to the ground-glass is 24½ inches, the focal length of the negative lens being 3½ inches; dividing the former by the latter gives us seven, to which we add one, and so find that we have an eightfold magnification.

By magnification is always meant *linear* magnification. That is, that any given line is so many times magnified in length. The area is, of course, magnified by the square of the linear magnification.

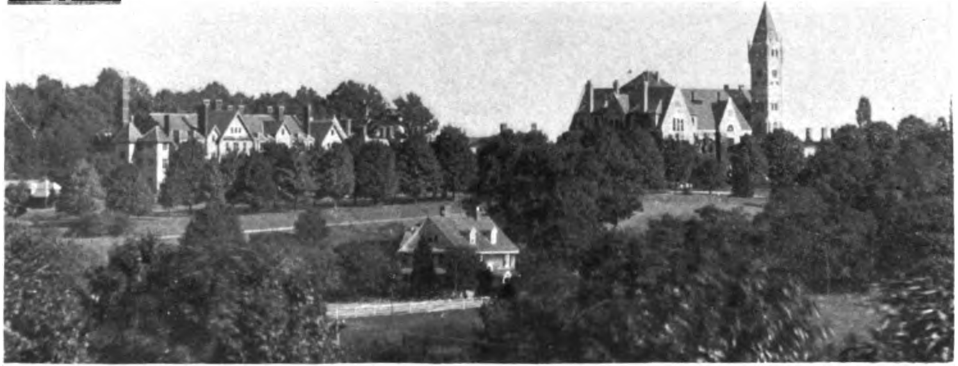
Three Suggestions Let me add three practical suggestions. If our camera lacks a few inches of the extension required, we can very easily have a cabinet-maker make a box giving the additional length, and from a locksmith we can get the necessary brass fittings. The ends of this box must be rabbited to fit snugly into the camera at the back to receive the reversible back for the plate-holder. The locksmith can duplicate the brasses that hold the pins of the reversible back. Or, we can content ourselves with the highest magnification our camera extension will permit. A second suggestion will save time and bother.



THE CAPITOL, WASHINGTON

Photographed from the top of the Washington Monument, 1½ miles distant, at an elevation of 550 feet. The exposure was made as the sun broke through the clouds during a series of showers. The small picture shows the view from the same point, as given by a lens of 14-inch focus.

Frank S. Dobbins



BRYN MAWR COLLEGE, NEAR PHILADELPHIA
From a point a mile distant
FRANK S. DOBBINS

This is to scratch upon the baseboard of the camera marks to indicate the various degrees of magnification. By the rule given above we can easily determine the camera extension necessary for any given magnification, and from that point, in units consisting of the focal length of the negative lens, we can mark the various magnifications. Then when we use the camera for telephotographic work we simply set the frontboard and the camera back at the marks for the magnification desired, and get the finer adjustment of focus by means of the focusing screw on the lens attachment. Of this more anon. A third suggestion will aid in securing rigidity in the camera. The lens attachment and shutter will project somewhat beyond the lensboard, and are rather weighty. This is apt to pull the lensboard out of perpendicular and cause more or less vibration. To offset this we may either fit a block to slip under the attachment resting on the baseboard of the camera if there is room, or we may have made a flat strip of brass with a groove or slot in it, and thus by two set screws, one in the camera front and the other at the top of the lensboard, we can make the extended camera rigid beyond possibility of movement or vibration. This slotted strip may be seen at the top of the camera shown in one of our illustrations. The slot in the strip allows for variation of extension in the magnifications desired. If the camera is one of those with extension at the rear as well as in front, most of the variations desired can be allowed for by closing up the rear extension, unit by unit, as a less and less magnification is desired. Thus the slot needed in the strip may be very small or dispensed with altogether.

Tripod

A strong tripod, better in quality than the tripod usually sold with hand cameras, is indispensable. The wobbly, flimsy affairs so often seen in the hands of camera men may be sufficient for the small camera, but are worse than useless for telephotographic work. For keeping the focus, for holding the image on the plate just where we want it, and for protection against vibrations, we must rely on the stoutness and rigidity of the tripod. Some workers insist that two tripods are better than one, as affording more complete support to the camera when fully extended, but I have not experienced this difficulty. Absolute rigidity of the apparatus and freedom from vibration are necessary, however, secure them how we will.

The great usefulness of some sort of a brace, such as Mellen's Tripod Stay, is obvious. Whether for keeping the tripod rigid, preventing slipping, or holding it together when one leg has to be placed higher than another as in photographing objects at an elevation, the Tripod Stay is an essential.

We have now a sufficient acquaintance with the meaning of telephotography, and the tools which make telephotography possible, to enable us to look at the advantages it offers, its applications, and the manner of working to be followed. This, with the descriptive matter on pages 58, 59, 60 and 61, embodies the practical advice and experience of Mr. Frank S. Dobbins, an amateur of but a few years' practice, who has followed the development of telephotography in a thoroughly practical way. The account Mr. Dobbins gives, and the illustrations accompanying his story, demonstrate the attractiveness of the work and the success which may be secured even by those who can only take up the camera as a means of occasional pastime.

Preliminary Points

Telephotography in practice is much simpler than its theory would lead us to suppose. It is inexpensive, and it offers peculiar advantages. These peculiar advantages are summed up in the fact that telephotography offers us a means of doing certain things not to be accomplished in any other way. It demands a certain amount of care and attention. It is easy, and yet there are difficulties. These will be discussed in detail as we become more familiar with the subject. It is sufficient to say here that there are no difficulties in telephotography which cannot be overcome by a photographer of ordinary intelligence. The ease with which telephotography gives us remarkable results is one of its greatest attractions, and we may fairly say that no other special use of the camera offers so much pleasure for so small an expenditure of money or trouble.

The Cost It is inexpensive. As far as the camera is concerned, it should have been mentioned earlier that all authorities agree in the opinion that a camera for plates 4 x 5, with bellows or other means of extension to 24 inches, best meets all requirements. If weight is of little moment a camera for 5 x 7 plates possesses obvious advantages in giving a somewhat larger picture. Larger sizes than this offer little in practical satisfaction. In studio work, of course, the telephoto system is applied to the ordinary studio camera. Telephotographic attachments capable of giving successful results may be purchased anywhere for from ten to twenty-four dollars. With the construction of these attachments we are already familiar. Many so-called telephoto arrangements are simply the cheapest of supplementary lenses added to give slight length of focus to ordinary lenses and are of little practical value. It is better to obtain the best attachment which we can afford as giving the greatest amount of satisfaction. The attachments made by Dallmeyer, Voigtlaender, Steinheil, the Bausch & Lomb Optical Company and R. & J. Beck, Ltd., may be mentioned as of the first order. There are also little attachments for use with rapid rectilinear lenses fitted to hand cameras. These give magnifications of from three to four and a half diameters, that is, images from three to almost four times as large as those given by the rectilinear lens used alone. The larger attachments give magnifications all the way up to ten diameters. These are adapted for the higher grade lenses, such as anastigmats, and permit of greater rapidity than is possible with less highly corrected instruments. And in a single telephoto combination we possess a battery or series of lenses varying in focal length from a few inches up to say sixty inches. An anastigmatic lens of only forty inches length would cost at least $300. The best of it is that the telephoto attachments are usable with camera boxes of modest length comparatively. If we have a camera with a good lens, a bellows capacity of, say, twenty inches or a little more, and a good firm tripod, we need nothing but the telephoto attachment to enable us to get picture images from six to eight times larger across than are possible with an ordinary lens photographing at the same distance away from the object. If one's camera happens unfortunately to be one of those with exceedingly limited bellows capacity, even this can be remedied at a cost of a couple of dollars by the simple addition of a box extension fitted to the back of the camera and having, in turn, the reversible back fitted to this box. So there is nothing in the matter of expense to balk the desires of the enterprising photographer who would venture into telephotography.

Advantages

It will be well, now, that we should look at the advantages of telephotography a little more minutely to see whether even this little outlay is worth while. Then we shall face the difficulties singly and see of how much or how little importance they are.

Distance Photography

The first great advantage of telephotography is in obtaining views of distant places which shall include more or less of detail. With a small attachment, such a one as fitted to an anastigmatic lens having a focal length of 7 inches, using a camera with a bellows length of about 24 inches, we may be sure of getting a view of distant objects which shall include *all the detail that the eye can take in, and a little more.* While with a lens of greater focal length, added to a negative lens in the attachment also of greater length of focus, and a bellows yet more extensive, we can get details that the eye can only see when aided with field glasses. Take, for example, M. Boissonnas' historical photograph of Mont Blanc. M. Boissonnas, of Geneva, made this famous picture from a point 44 miles distant. He used a camera having an extension of 5 feet, and an orthochromatic plate 16 by 20 inches. To have made the same sized image with the positive lens alone, without the telephoto attachment, he would have needed a camera having a bellows capacity of 25 feet, and an enormous lens. How different the view he obtained from that usually gained by the long-focus lenses in common use is easily seen by comparison with the smaller view. But this is an exceptional instance, involving the possession and use of powerful lenses, etc.

For ordinary results one can easily see, by referring to the illustrations scattered through this monograph, what can be done under usual circumstances, with an inexpensive equipment. Look, for instance, at the photograph of the City Hall, Philadelphia, taken from Belmont hill, three and a half miles away as the crow flies. Contrast the result given by an ordinary positive lens of 7-inch focal length, and that gained with a telephoto combination consisting of this 7-inch lens combined with a negative lens at 3½ inches focal length and a bellows length of about 24 inches. The great increase in the size of the image, its perfect clearness, aye, and a certain atmospheric effect (a friend of the photographer remarked, "It looks like the New Jerusalem, yet one cannot forget the political life of another sort beneath that great tower,") not possible in a picture taken with even a 14-inch lens. Similarly one notices many other such contrasts, as in Bryn Mawr College, taken a full mile away. With the naked eye one cannot make out even a dial upon the tower clock, yet here it is discernible, and this is but a six-fold magnification. In this particular instance one great advantage is to be remarked. The view-point whence the illustrative telephotograph was taken is the only one from which any view at all is possible of the buildings as a complete group. On all other sides houses shut in the view. On this side there is, as one can see, a depression in the ground which prevents a photographer from any good standpoint nearer than this. The very best he could do, without the telephoto attachment, would be to use a long-focus lens and then to make an enlargement.

For yet another illustration of an advantage to the telephoto attachment, let us notice the view of the Capitol at Washington, made from the top of the Washington monument. This is a mile and a half away. It is the vantage point for a fine view of the Capitol and the Congressional Library. Unfortunately the day on which the telephotograph was made was very showery, the sun peeping out through the clouds at intervals. There was, too, a mist rising from the ground. It was the only opportunity for the photographer, and he made the best of his chance. From the negative of smaller illustration, made with a 14-inch lens, an enlargement on bromide paper was made, aiming to bring the image up to the same size as that in the telephotograph. The grain of the plate was plainly to be seen, the lines were slightly blurred, and the whole atmospheric effect was missing.

Perspective Improved

For very distant objects, for views of buildings to be seen to advantage only from points too distant for any considerable image when made with the ordinary lens, the telephoto combination is essential. In the case of objects several miles away the perspective is very greatly improved; in the case of views of villages and the like, a half a mile or so distant, there is a curious crowding together of the various focal planes that is not so good from the artistic or photographic point of view.

Architectural Details

In the photography of buildings, and especially of inaccessible architectural features, the telephoto combination offers decided advantages. We have examined scores of telephotographs which show beyond all question results that are simply wonderful. In *Scribner's Magazine* two or three years ago there was an article by Mr. Dwight L. Elmendorf on "Telephotography," with illustrations. The best points from which to take photographs of parts of some of the great Cathedrals of Florence, Venice, etc., were so far off that no detail at all could be had of splendid mosaics, magnificent mural paintings and other architectural features. By using a telephoto attachment in a tube 3¼ inches long and a camera with a bellows length of less than 24 inches for a 4 x 5 plate, Elmendorf secured views giving all the details faithfully. In the instance of the beautiful capital of the Corinthian column of Girard College, Philadelphia, there is no position one could possibly take from which to get an enlarged image of the capital. (Hereby hangs a little tale also illustrative of an advantage of telephotography. This telephotograph was made by a clergyman. Now clergymen are, by a clause in Girard's will, prohibited from going upon the grounds of Girard College. This particular minister was allowed to place his camera just within the gatekeeper's lodge. With his telephoto attachment he could get as large an image as if he had been permitted to go, with an ordinary lens, within a few feet of the college building. So, ofttimes, when one is barred out from near approach, not merely by physical obstacles, but by restrictions of other sorts, he can get what he wants with the telephoto lens).

Objects at an Elevation

So also in securing architectural details across chasms of streets, or (if the camera has a sufficiently well arranged swing-back) where the object is far up above the highest available working base, we may get precisely what we seek with the telephoto combination. As a matter of fact, if we use a telephoto combination giving an eightfold magnification, it is exactly as if the camera were perched seven-eighths of the distance nearer the object. If we choose a sixfold magnification, it is just the same as if we were moved up five-sixths of the distance nearer the subject, and so on.

Portraiture

In portraiture, likewise, the telephoto combination may be employed to great advantage. Every one knows the distortions resulting from bringing a camera too close to the sitter. The nose and lips become too large and the limbs are strangely foreshortened, since the perspective is bound to be faulty under the circumstances. If a long-focus lens can be used these distortions disappear. But very frequently the length of the studio prevents this. In such circumstances even a modest telephoto attachment, with a fivefold magnification, will give a result equal to the longest camera usable in the largest of studios. I regret that I cannot offer an example of the improvement thus effected. Several portraits made with telephoto and ordinary portrait objectives for purposes of comparison are given in Dallmeyer's "Telephotography."

There is advantage, too, in the important detail of cost. If the photographer wishes to get a "life-size" head he needs a camera with an extension of 80 inches for normal perspectives, and a lens of 40 inches focal length with a diameter of about 5 inches. The lens must be 80 inches from the sitter. These distances are calculated (by Mr. T. R. Dallmeyer) with a view to getting the least possible distortion. A good lens of this description would cost, at the very least, $400, and would be of little use for ordinary work. If we possess an ordinary anastigmat, and add a telephoto attachment costing not over $20, we can get the same result. Take, for example, a 10-inch positive with a negative lens of 4 inches focal length and a camera extension of 24 inches and precisely the same result is achieved. I have tried all the magnifications possible from four- to eightfold, and this "life-size" image, and in every instance the resulting photograph was artistically an improvement over that made by the positive lenses alone.

In Nature Study

Another field of great usefulness for the telephoto combination is in nature study. With the telephoto attachment we overleap the distances between birds and beasts, and we come, for purposes of photography, very near to them, while yet we are so far off as not to disturb them. Birds upon the nests, animals in their haunts,—all these are now more easily photographed than ever before. Mr. R. B. Lodge, Mr. Kearton, Mr. Chapman, and others have done splendid service in this field within the past two or three years. Trees can be photographed with the telephoto combination in far better proportions; cliffs, jutting rocks, strange formations, tops or bottoms of great cañons, the inaccessible everywhere is climbed by the leaping light, and images are painted upon the photographic plate that can be studied with joy for the minute detail they give — provided the telephotographic lens is applied intelligently.

Disadvantages

There are other advantages of the telephoto combination, but as they are for specialists we need not enter into their consideration here. Over against the advantages there are to be set several disadvantages. Let us be perfectly fair and not omit the mention of any difficulties nor in any wise seek to minimize them.

Prolonged Exposure

One very great difficulty, absolutely insuperable, is the necessarily prolonged exposure. We cannot increase the size of a plate to be covered with a certain amount of light, nor prolong the pencil of light without increasing the exposure. It is precisely the same as if one used a lens of the same focal length as the telephoto combination in any given magnification. A long exposure is unavoidable. But the difficulty is not nearly so great as one might think. To begin with, most of the work with the telephoto attachment is distance work, and every one knows the tremendous discounts in exposure to be made on account of distance. Towards the end of the discussion we shall consider very fully this question of exposure.

An Experiment

I began some time ago a series of experiments in exposure with a telephoto combination, taking as a starting-point the rule that the exposure is to be the multiplication of the normal exposure with the ordinary positive lens by the square of the magnification employed. For example; if a single second was required with an ordinary positive lens at *f*/16, then with the telephoto combination, using the same positive, and a negative lens of half its focal length (making an eightfold magnification) sixty-four seconds would be required. All the writers on telephotography give this rule. But it was very soon proved beyond all question that this was the *maximum* exposure for dark objects and in a very poor light. I took a series of plate-holders for 6½ by 8½-inch plates, and marked the slides in divisions of a little over an inch. Enough plates were used to make just 100 exposures, one right after the other, on the same subject, drawing out the slide the inch or so for each exposure. The experiment was so calculated that there was a gradation which should bring the last fraction of the plate to an exposure according to the rule. The result was surprising in demonstrating how much less exposure was needed. The old Independence Hall in Philadelphia, from the balcony of the City Hall tower, a mile away, was taken as the subject, and the exposures were made in quick succession without any change in the arrangements of the camera. The plates were developed in the same developer, and development was carried forward to the same point as nearly as possible. The results showed that the right exposure was about one-half of that required by the rule. For stable objects there is no trouble at all. With a stop of *f*/11 (U. S.

No. 8) under fairly favorable circumstances, with an eightfold magnification, where the normal exposure with the positive alone would be $\frac{1}{64}$ of a second, we can secure excellent results with a single second's exposure, using the eightfold magnification. Surely that is not hard to compass. Apply this in portraiture where, with a good light, we work with an aperture *f*/4 for the positive system, and we see that the question of exposure need not seriously interfere with success.

Wind

Another difficulty lies in the disturbance due to wind. Even a gentle breeze is somewhat disconcerting. Even with a stout tripod, when one opens up the camera to an extension of a couple of feet, there is considerable surface exposed to the wind. Then, too, the objects will show vibration. We may lash the tripod and camera fast to a telegraph pole or a tree, but we cannot tie down all nature! It is a question of patience. There are days when the wind does not blow very hard; lulls often, which one can seize. A clear day, in some seasons, is apt to be a windy day. Therefore, we are a little restricted as to favorable times for telephotography out of doors.

Atmospheric Disturbances

Another trial is in the matter of a lack of homogeneity in the atmosphere. Dust sometimes interposes a haze; more often heat will set the air all a-dancing between the camera and the object to be photographed. The haze can be cut out in a measure by the use of a color screen; but for the disturbance caused by intense heat there is no remedy, excepting that of seeking the cooler hours of the day. Mr. Marriage says, by the way, that he gets his best telephotographs before ten o'clock in the morning. If there can be a choice of time I would advise a clear day when the air is quiet and not very warm, and the earlier part of the day, if the sun is right for his work. Moreover, a haze that is apparent to the eye, and that would seriously affect an ordinary photograph, may scarcely be noticed in a telephotograph, the reason being that the telephotographic combination carries one so near the object in reality. There is a "pluck" and a fine definition about telephotographs of distant objects not seen in ordinary photographs.

Perspective I have already alluded to a curious and perplexing way that buildings and the like have of piling themselves together in telephotographs taken from a distance of a half a mile or so. In an instance before me a house, with a turret, and a church building beyond it seem to be in the photograph about a hundred feet apart and the houses in between seem built up against each other. As a matter of fact, the two are over a thousand feet apart and there are spaces from a hundred to two hundred feet between the houses. This difficulty, which is increased as one seeks a larger magnification, is manifest in a photograph having an eightfold magnification, but is hardly noticeable in one made with a fivefold increase.

Bulk It may be objected that the bulkiness even of a compact telephotographic equipment is a difficulty. This applies only to those who desire to use large plates, as, for instance, 11 x 16 or 16 x 20 inches. Such enthusiasts are rare. As already advised, a camera for plates 4 x 5 or 5 x 7 inches fulfils all reasonable requirements for outdoor work.

A 5 x 7 camera need not be bulky, even with generous bellows extension. Personally, I use a camera of the folding type for a 4 x 5 plate. Since it gives a bellows extension of only 19 inches I have added to it a box 6 inches in depth into which the reversible back is fitted. The camera and box fit snugly into a canvas bag for convenience in carrying. In the box are placed 6 plate-holders, the telephoto attachment, a rod to hold the camera front taut, focusing cloth and glass, and a color-screen. The case measures 18 x 8 x 7 inches and, including a dozen plates, weighs just thirteen and a half pounds. This is not a tremendous weight for an active man, and is carried without fatigue suspended from one shoulder when awheel or afoot.

Another difficulty must be mentioned. In the use of low magnifications the image circle is lessened. We have seen that the various magnifications of the image are effected by bringing the positive and negative lens systems nearer to each other. Correspondingly, to decrease the magnifications the two systems are fixed further apart. This lengthens the tube, which results in a shadow or dark ring being formed upon the plate, cutting off the image at the corners. As we increase the magnification the circle of illumination increases also. This difficulty is one we cannot overcome, although in using the modern anastigmats as the positive system, we gain a slight advantage because of the larger field of illumination given by these lenses. Perhaps the best plan is to make use of a higher magnification, such as a sixfold, rather than a lower one. We often, in fact, find the advice to make use of fivefold and sixfold magnifications for general purposes.

Hand Cameras and Telephotography

In this discussion of difficulties I have had in mind the use of large cameras and the larger telephoto attachments. With the more recent application of telephoto lenses to the hand camera many of these difficulties are non-existent. Take, for instance, the little attachment, costing from $9 to $11.50, made expressly for hand-camera work. This is obtainable in three sizes, to suit three makes of cameras. It gives a magnification of from two and a half to three and a half times the image normally given by the rapid rectilinear lenses ordinarily used with the camera, and does not require to be specially adjusted by a lensmaker. For example, with the earlier form of Cartridge Kodak we get with this attachment a magnification of two and a half times; but with the new form, having greater bellows extension, we can get an image three and a half times larger than normal. These lenses are sufficiently rapid for ordinary purposes, but I doubt whether they will give instantaneous exposures except under most favorable conditions. Generally a "bulb exposure" of say one-half second will be required with the largest aperture. Steadying the camera against a post or wall, or with a stick, is sufficient for such an exposure, and there is little chance of difficulty from the wind, or with variations atmospheric, and comparatively no distortion with so low a magnification. There is, of course, a slight lessening of the image as with other telephoto attachments. The addition of weight with these small attachments is a matter of ounces only.

I can think of no other difficulties to be mentioned. The advantages far outweigh the disadvantages, and a little practice will convince the telephotographer that in his telephoto equipment he has a new and valuable power at his disposal.

Plates

A word or two about plates, and then we can take up actual work out of doors. Any plate may be used in telephotography, but as we read the experiences of those who have worked long and patiently in telephotography, we will observe their universal recommendation of orthochromatic or color differentiating plates. There are good reasons for this. Telephotography counts among its attractions a remarkable facility for giving tone values and atmospheric effects, and in all work of this sort orthochromatic plates offer definite advantages. In cutting out haze, rarely absent from distant views, a color-screen may be required, although we now have orthochromatic plates which work without a screen. Ordinary plates, used with a screen, require often as much as seventy times the usual exposure, while with orthochromatic plates and a screen we need rarely prolong the exposure more than four times that ordinarily required. There is also a valuable tendency to minimize halation effects in color-sensitive plates, which is advantageous for telephotographic work. It should be noted that in no other form of photography are backed plates so plainly indicated as in telephotography, and now that ready backed rapid plates are commercially obtainable their advantages should not be overlooked. Generally speaking, a rapid plate will be needed. There are times, however, when we can use a slow plate which, in my experience, is decidedly preferable. A plate of medium rapidity will often be useful as combining in part the advantages of rapid and slow varieties.

Actual Work

In taking up work out of doors, it is well to keep in mind the wisdom of keeping out of the wind as far as is possible. There is no need to seek trouble, and a location can often be found where the camera may be comparatively sheltered. Now let the telephotographer set up the camera and examine the ground-glass. It is, let us suppose, a clear, quiet day, and fairly early in the morning, say between nine and ten o'clock. He does not notice any tremulation in the air, and atmospheric conditions are favorable. The tripod legs are placed well apart to secure a sure foundation, and properly braced. The image is first studied with the positive lens alone (before the telephoto attachment is adjusted to the camera). Probably it will be as well to make an exposure with the positive lens alone as a basis for comparison with his later work with the telephoto combination.

Attach the Telephoto Lens

Then he will attach the telephoto lens, and, note this very important matter, he will give to the posterior lens of the positive system a slight turn, perhaps a fourth or a half turn. This is for the purpose of correcting the spherical aberration. For an experiment place the positive in position without making this turn, and notice that the edges of the plate are slightly out of focus if the center is just right. Removing the positive, give the quarter or the half turn and note the result. Perhaps another quarter turn may be necessary. There is no definite rule that will apply to all lenses and all mounts. But once determined upon any worker knows just what to do next. It was a long while before I found this out. It was discovered as the result of an accident. One day, when working with the telephoto combination, in screwing the positive system into the shutter (it had been used in another shutter) accidentally the rear element of the positive was left a little loose. Noting that the picture was clearly defined to the edges I sought an explanation for it, and finally found it to be in this slight increase of the distance between the two lenses forming the positive system. Later on in an article by Dr. E. J. Spitta, in *Photography* (for March 23, 1899), I discovered a mention of the dodge and its explanation. We next determine, roughly perhaps at first, what magnification is desired, so as to bring upon the plate just as much of the view as is thought best. The camera is extended to receive the magnification and the telephoto attachment is racked out to the mark for that magnification. Then the fine focusing is done with the adjusting screw of the telephoto attachment. The color-screen is placed either before, or preferably behind, the lenses. The largest stop is used in the focusing. In the actual exposure a somewhat smaller stop will be selected. It may be *f*/11 (No. 8 U. S.) or possibly *f*/16 (No. 16 U. S.). It is useless to operate with any smaller stop, for the loss of intensity by the addition of the negative lens is such that any smaller stop than *f*/16 is really too small for precise definition; indeed, with a high magnification even that is too small.

Restraint

The telephotographer needs to be always on his guard against the temptation to get the largest possible magnification with his combination of lenses. Any sacrifice of mere bigness usually meets with compensation by the lessened exposure, by a greater sharpness of the image or by artistic qualities. In the use of a telephoto objective as with the stereopticon, an instrument may be capable of giving a picture 25 feet in diameter, but there is great gain if the operator is content with one but 15 feet across the screen. A fivefold or a sixfold magnification is best under almost all circumstances.

The Problem of Exposure

Now comes the really important question, where trouble is most likely to arise and discouragement to follow: the question of exposure. As we have already said, in referring to this difficulty the problem has been practically solved by means of a lengthy series of experiments. Further experiments may make some modification in the tables of exposures to be presented, but there is not likely to be any very great variation.

We may use an exposure meter, such as the Wager or Wynne, to ascertain the normal exposure under ordinary circumstances, or we may make use of a table of ordinary exposures, such as that given in The Photo-Miniature, No. 14. Or, we may have recourse to both. On our way to the place where the telephotographs are to be made we may work out the right exposure according to the table, and on arriving at the destination, compare it with the figures given by the exposure meter. This double labor is well repaid by the results. Inasmuch as the multiplication, especially for the higher magnifications, is so great, a slight error is magnified correspondingly, so it pays to be cautious and to use several bases of comparison. If the meter could be absolutely depended upon, doubtless that would be all-sufficient, but as a little dampness may make it slow and the result would be a great overexposure, one needs to have something with which to test it. I have, therefore, prepared the following table of normal exposures, for use with the ordinary photographic lens, and a second table giving the number of times the ascertained exposure under ordinary circumstances is to be multiplied for a telephotograph. The first table is based upon a half a dozen different tables, tested in various ways; the second is the result of a series of wholly original experiments. The tables apply to the United States only, and not to conditions in other countries.

TABLE A—NORMAL EXPOSURE WITH ORDINARY PHOTOGRAPHING LENSES

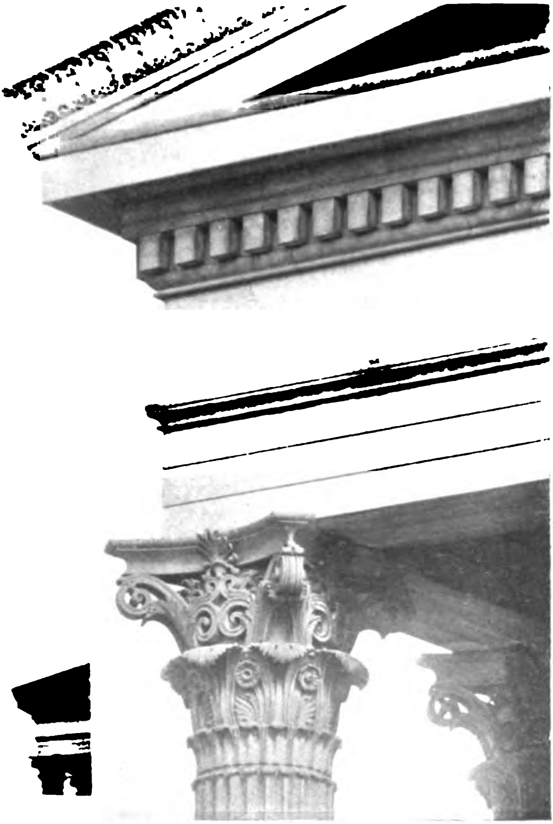
General Rule: *Multiply the time given (fraction of a second) in the first table by that given in the second, then by that of the third, and finally by that of the fourth.*

TABLE 1.—For an exposure, using Stop No. 4 U. S. (*f*/7.7), with the most intense light and fastest plates:

MONTH	HOUR OF THE DAY				
	A.M.—6	7	8	9	10
	P.M.—6	5	4	3	2
April to August	$\frac{1}{10}$	$\frac{1}{16}$	$\frac{1}{20}$	$\frac{1}{32}$	$\frac{1}{48}$
March and September	$\frac{1}{2}$	$\frac{1}{8}$	$\frac{1}{16}$	$\frac{1}{24}$	$\frac{1}{32}$
February and October		$\frac{1}{4}$	$\frac{1}{12}$	$\frac{1}{20}$	$\frac{1}{24}$
January, November and December		1	$\frac{1}{8}$	$\frac{1}{10}$	$\frac{1}{12}$

TABLE 2—*Character of the Object*

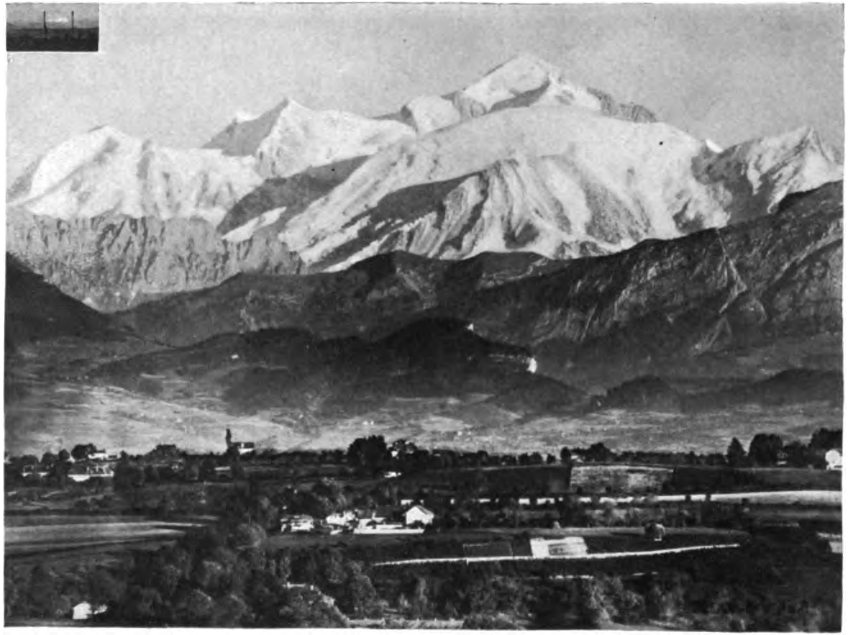
Sky, clouds, etc.	⅛
Snow, distant scenes	¼
Very open landscapes	½
Ordinary landscape, trees, etc.	1
Dark objects, including portraits taken out of doors	2



CAPITAL OF CORINTHIAN COLUMN, GIRARD COLLEGE, PHILADELPHIA

From a point 600 feet distant, the only available location. The small picture was made from same point with positive lens only, without telephoto attachment.

Frank S. Dobbins



MONT BLANC, FROM GENEVA, 44 MILES DISTANT

This is perhaps the most remarkable of telephoto achievements. In the original negative, 16 x 20 inches, the definition is much more delicate, and the shadows are full of detail. The small picture shows the view from the same distance, taken with a 15-inch lens, and is reduced in the same scale as the larger view.

FRED. BOISSONNAS. 1802

TABLE 3—*Character of the Light*

Intensely bright	1
Rather bright light	1½
Faint shadows, slightly dim	2
Dull	3
Very gloomy	4

TABLE 4—*Speed of the Plate**

Seed 27, Cramer Inst. Iso.	1
Seed 26, Carbutt Eclipse, Cramer Banner	1¼
Carbutt, Ortho. 27	1½
Seed 23, Cramer Iso. Med.	2½
Carbutt Ortho. 23	4
Cramer Iso. Slow	12
Carbutt B. 16	20

Example

It is 10 o'clock of a morning in June; we are taking a well-lighted object in an ordinary landscape, the light is bright, we shall use a medium isochromatic plate and the ordinary positive photographic lens (not a telephoto combination). Ten o'clock in June is 1/48 second; multiply this by 1 for the ordinary landscape, then by 1½ for the bright light, and this by 2½ for the medium isochromatic plate, and the result given is about 1/12 second for the No. 4 stop. Of course, if we use a smaller stop we multiply in the well-known way of doubling the exposure for each halving of the area of the lens diaphragm. This simply furnishes us a basis for further calculations.

A Step Further

In considering the proper exposure for the telephoto combination, we may approach our end by two ways. We may find the rule of photographic optics governing the matter, or we may experiment until by successful results we reach a conclusion. If one result does not agree with the other, then we may look for the explanation of the matter.

Reference has been briefly made to the fact that the telephoto combination accomplishes precisely the same results, as far as the magnified image goes, as a positive lens having a much greater focal length than the combined lenses of a telephoto combination. Let us, first of all, reduce this to a precise statement.

---

* I am obliged to limit this table to such plates as I have used and therefore know by experience.—F. S. D.

The rule for finding the focal length of a positive lens equal to that of a given telephoto combination is this: *multiply the focal length of the positive lens by the magnification.* Thus with an eightfold magnification, using a positive lens of seven inches focal length, the telephoto combination would, with a bellows extension (ascertained according to the rule previously given for the purpose), of 24½ inches, be equivalent to a positive lens of a focal length of 56 inches. This would be a lens 9 inches in diameter, in a mount nearly a foot long, and requiring a tremendous camera; the whole would be a wagon-load. The accompanying table exhibits this matter of comparative focal lengths and the bellows-length needed for various magnifications. The calculation is based upon a telephoto combination of a 7-inch positive with a negative lens of 3½ inches.

MAGNIFICATION	CAMERA EXTENSION REQUIRED	
	With telephoto comb.	With ordinary lens
Eightfold	24½ inches	56 inches
Sevenfold	21 "	49 "
Sixfold	17½ "	42 "
Fivefold	14 "	35 "
Fourfold	10½ "	28 "

A Basis for Figuring

This table does much more than show the great gain in the saving of bulk and unwieldiness; it gives us a basis of calculation in the matter of exposure. The exposure for an eightfold magnification, using the combination described, must be precisely the same as we would use were we working with a lens of 56 inches focal length. Or, to arrive at the same result in another way, if we have a symmetrical doublet with a focal length of 7 inches, and if either element alone has double the focal length of the doublet, every one knows that a double exposure is required for this doubling of the focal length, and that the stop must be doubled in size to equal that used with the doublet. So we reach the rule that in telephotography *the exposure must be the multiplication of the exposure required under or-*

dinary circumstances with the positive lens only, by the square of the magnification. For example, if with the ordinary photographic lens one would, with any given stop, make an exposure of one second, with an eightfold magnification using the same positive, he would require sixty-four seconds.

Modifications

This is the rule, but it needs much modification. It seems as if distance diminishes the necessary exposure far beyond one's expectations, or as if the diffusion of light incident to distance work is more than one would look for. And there are other factors which still further modify the result. My experiments have resulted in so great a modification of the conclusions of this rule as to astonish me, while affording cheering encouragement in proportion to the diminution of the exposure, longer, at best, than one wishes.

TABLES FOR USE WITH TELEPHOTO COMBINATIONS
(Positive and Negative Lenses)

Rule: *Multiply the normal exposure required by ordinary photographic lenses by the figures given.*

Note: The figures are *ratios*, and *not seconds.*

TABLE 1.—For objects 1,000 feet distant or less, using no color-screen:

MAGNIFICATION	8	7	6	5
Dark objects in shadow	64	49	36	25
Dark objects in good light Bright objects in shadow	48	36	27	18
Bright objects in good light	32	24	18	12
Bright objects in intense light	16	12	10	8

TABLE 2.—For objects more than 1,000 feet distant, using a color-screen and isochromatic plates. If no screen is used, the exposure will be, of course, but one-fourth the length of time when the screen is used.

MAGNIFICATION	8	7	6	5
Dark objects in shadow	64	49	36	25
Dark objects in good light Bright objects in shadow	50	38	28	20
Bright objects in good light	36	28	21	15
Bright objects in intense light	22	18	14	10

Example For example, referring back to a previous calculation of a normal exposure, where we found that for an ordinary landscape, at 10 o'clock on a June morning, the light being bright and a medium isochromatic plate being used, about one-twelfth second would be needed, if we used a No. 4 stop. Out of that landscape we select one object, a great granite tower, for instance, with the light shining fairly upon it. It is three or four miles away. There is a little smoke from the near-by railroad station and some haze, so we use the color-screen. We wish to make an eightfold magnification. We find the ratio for a bright object in a good light to be 36 and we multiply our one-twelfth second by that figure, and the result is three seconds.

Of course it is impossible for one to provide here for every possible contingency. There are differences of definition and other matters touching the personal equation in work of this sort that make it absolutely impossible for one individual to furnish a guide for another with unerring assurance. These tables, however, will be found so near to the settlement of the problem of exposure that any telephotographer can readily furnish his own modifications after a little experience. Usually, at first, it will be better for one to make several exposures above and below the standard given, carefully noting data and, after development, results.

At Closer Range The above is especially concerned with long-distance work. For convenience the table for work at closer range has been put with the other. The division point of a thousand feet is arbitrarily fixed, and it is suggestive and not absolute. Telephotography is of as much advantage for securing an enlarged image of near-by objects as for far-away scenes. Especially is this true in the matter of architectural photography. Many details are above and beyond the reach of the ordinary camera, and so it often happens that views of buildings taken with an ordinary lens, from a near-by point, show a distorted perspective. By having recourse to a telephoto combination we can obtain what is desired and with correct perspective.

In Architecture In no other class of work have the results been more marked than telephotographs of architectural details. Capitals of columns, high above the street level, façades of great cathedrals, bits of mosaic or of bas-relief, towers and statues, great rose windows, over and again within the past ten years have been photographed in all their beauty with a satisfaction never obtained until the telephoto combination was utilized. Details that have been apparent to the eye, but which have never been shown in any photograph, have been thus caught and kept. But even beyond this is the beauty of the perspective and the atmospheric effect. If one fancies that telephotographs are lacking in pluck, in the least sharpness of detail, in contrast, let him study a few specimens of these products of the present-day lens in its application to architecture.

Color Influences The telephotographer needs, when he comes to turn his attention to architectural work, to be on his guard in one particular. The character of the object, its color running from darkest bronze to brightest marble, its surface sometimes perfectly flat or again full of intricate carving or severely recessed, and its relation to its environment will necessitate more careful judgment in the matter of exposure. Yet nothing extraordinary is demanded, nothing but what is well within the control of the ordinary amateur or professional.

A Tilting Board An additional bit of apparatus is desirable. Frequently the object to be photographed is at such a height that a considerable tilt must needs be given the camera. Extended to a considerable length, as it must be if a great magnification is attempted, the ordinary tripod is not enough; the top-heavy arrangement is likely to topple over or to slip. If one will take two bits of thin board, say ⅜ of an inch in thickness, and hinge the lower end, putting a strip of brass with a set screw on the front or on both sides, or using a wedge of a block to keep it at the angle, he will find it a great help. There should be a tripod screw socket in the lower board to attach it to the tripod, and another with a screw in the upper board by which to attach it to the camera. It is well to put a light strip at the rear end of the upper board to reënforce the screw and to prevent the camera from slipping. Then, with a stout tripod well planted on the ground or pavement, its legs well braced apart, we are ready for using the camera at any angle.

Two Tripods

If we choose we can use one board and two tripods, as already suggested. To be sure, the camera must have a swing-back with a good range of motion, so that the plate may be parallel to the plane of the object being photographed. Generally it is better for the telephotographer to seek, first of all, the best view-point, to establish his camera there, and then by adjusting the bellows-length and the telephoto combination, start with a smaller magnification and gradually increase it until the picture pleases him in every way — as to size of the image and as to detail. It is bothersome, in truth, to have to shift the camera from point to point. The amount of tilt should always be kept down as far as possible.

Bringing one Nearer

The fact that the telephoto combination in actuality brings the photographer up to within one-eighth, or one-seventh, or one-sixth of the distance from the object, is of immense importance. Take a high column whose graceful Corinthian capitol we desire to photograph. To get an image worth the effort we should be within say thirty or forty feet of the subject at least, but how can we get anything but the most ridiculously distorted picture if obliged to stand at the base of a column sixty feet high, without the power to approach any closer? With the telephoto combination we can locate ourselves 300 feet away and in reality bring the camera up within the thirty or forty feet of the subject. No bromide enlargement can equal in this architectural photography the work of the telephoto lens. Enlargements magnify the grain of the plate and every trifling defect of the negative, and enlargements are limited to the bromide papers and thus they can never have the brilliancy of prints made by direct contact with other papers.

Portraiture In portraiture the telephoto exposure must necessarily be dependent upon the rapidity of the positive lenses. Since it has been discovered that high-priced anastigmats are not absolutely necessary for telephoto work, but that the ordinary portrait lens offers peculiar advantages, it is easier and less expensive to have a special attachment for the regular portrait lens. While exposure with the attachment must be longer than without it, it need not be abnormally long. With good light, such as we have in most studios, it will rarely exceed practical limits, as the intensity of the system is seldom lower than *f*/6.

Groups For photographing groups the telephoto lens has decided advantages. With the ordinary lens the heads of persons in the rear are always much smaller than of those in front, and where there are four or five ranks of people the difference becomes very marked. Working as a long-focus lens the telephoto combination presents the heads very nearly of the same size. One is also enabled to get a position of vantage not obtainable with an ordinary lens. If a group be gathered about the door of a church building or of a school, for instance, we can, by getting on the further side of the street, often secure an elevation from which a far better view can be had than from the depressed center of the street, below the level of the group. Out of doors the increase of exposure is not noticeable, as at most it need not be, with a fairly rapid lens, more than a few seconds with a quick plate.

In Astronomy In astronomical work the ordinary telephoto lens is not of much service excepting in photographing the moon or sun. It is easy with the smaller of the telephoto combinations to get an image of the moon nearly a half inch in diameter showing the dark places ("the man in the moon") very clearly. To be sure, if we have a large telescope and fit to it a negative lens, etc., we could get a larger image. The exposure for the full moon on a clear night with an eightfold magnification, using the largest stop, is three seconds. With this there is appreciable blurring from the moon's movement.

A New Lens In conclusion, reference should be made to announcement made just one year ago of a patent taken out by Mr. T. R. Dallmeyer, of a new arrangement by which the negative lens is placed in a hood in front of the positive lens, and the exposure very greatly lessened. But nothing further up to this writing has been heard of the invention.

BOOKS

Telephotography. An elementary treatise on the construction and application of the telephotographic lens. By Thomas R. Dallmeyer. 148 pp., with twenty-six plates and sixty-six diagrams. 1899. $4.00.

A Monograph on the Nature and Application of the Telephotographic Objective. By Dr. P. Rudolph, Jena. Translated into English by R. Kanthack, Jena. Carl Zeiss. 1896. Obtainable only from Carl Zeiss Optical Works, Jena.

Practical Notes on Telephotography. An illustrated pocket book of about 50 pages. Prepared by R. and J. Beck, Ltd., London, and sold at 6d. (25 cents).

Elementary Telephotography. By Ernest Marriage. The best general text-book on the subject. 117pp. Illustrated. (English). $1.75.

See also the catalogues of the Bausch & Lomb Optical Company, the Voigtlaender & Son Optical Company, J. H. Dallmeyer, Ltd., and Steinheil & Son, in all of which may be found useful information and special tables.

ANTI-TRUST

PURE
COLLODION
PAPERS

MONARCH MATTE

MONARCH

TRADE MARK

MONARCH GLACE

RELIABLE
UNIFORM
PERMANENT

Three times quicker printing than any other

MANUFACTURED ONLY BY THE

MONARCH PAPER COMPANY

E. & H. T. ANTHONY & CO.
SOLE TRADE AGENTS
122-124 Fifth Avenue
NEW YORK

ANTI-TRUST

NOTES

Is it possible to make really satisfactory photographs of places and things without a lens? Is the so-called "pinhole photography" worth looking into, or is it simply an experiment? If it is capable of practical use, or of giving pleasure, why do we not hear more about it? Where can I find it explained, and its practical working demonstrated in a very simple way?

Such are a few of the many questions about "pinhole photography" put before us during the past few years. Now there can be no doubt whatever of the practicability of making photographs without a lens, by means of what is generally, but erroneously, known as a "pinhole attachment" used in the place of the lens. This has been demonstrated again and again. The results obtained in pinhole photography are, indeed, such as to surprise those who have not given the subject the attention it deserves. The chief difficulty with regard to lensless photography has been the lack of plain and practical information as to how to go about it successfully.

In The Photo-Miniature for June this lack will be most fully supplied by plain information and attractive illustrations—the first satisfactory book on the subject. As our readers have doubtless discovered, we have a larger pleasure in some numbers of The Photo-Miniature than in others. In the forthcoming number on lensless photography we have an unusual degree of pleasure, which we feel sure will be shared by all who read the little book. It is written and illustrated by one who knows not only how to make excellent pictures with the simple needle hole, but also how to tell the story in an interesting way. But we will say no more about it—except that we hope to have the number ready not later than the 20th day of June.

THE J. C. MILLEN
MANUFACTURING CO.

announce that

"Etching Matte"

will now be manufactured under the personal supervision of Dr. Millen, the inventor of this process. This guarantees an article of the highest standard, and the paper is offered to the photographic public with full assurance that it will give perfect satisfaction.

ETCHING MATTE is a pure Platinum Paper which requires nothing but cold water for its perfect development.

Full Literature, Price List, and Sample Print on request.

THE J. C. MILLEN
MANUFACTURING CO.

Denver, Colorado, U. S. A.

Are there any "plum cranks" among the readers of THE PHOTO-MINIATURE? If such there be, we direct their attention to the fact that Mr. F. A. Waugh, of *Gum-bichromate Printing* and *Landscape Photography* fame, has written a book on "Plums and Plum Culture," which they should see. Therein he says: "Among the specialists in the different lines of pomology no one lot exhibits more ardor, enthusiasm or *esprit de corps* than the self-styled 'plum cranks.' Their attitude towards themselves and the rest of the world is rather refreshing and considerably significant.

"Under the circumstances the publication of a book on plums could not long be delayed." [Orange Judd Co., New York; $1.50.]

◆

Several attractive photographic competitions are announced, with substantial rewards for the victors. Particulars may be had by prompt application to the publishers of the *Youth's Companion*, Boston, and the *Ladies' Home Journal*, Philadelphia.

◆

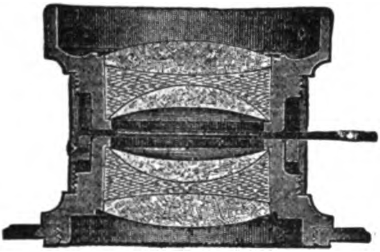
Mr. F. Dundas Todd, in the May *Photo Beacon*, proposes an annual convention of amateurs in photography. He figures that there are at least three million amateurs in this country, and opines that a magnificent organization could be effected from such a host. The idea is a good one, but its realization will be "another story." A better scheme, as far as the three millions of amateurs are concerned, would be the endowment of the *Photo Beacon*, with Mr. Todd as editor-in-chief. This would provide the amateur with perennial happiness in small doses at little expense—two points about which the amateur is scrupulously particular.

◆

A very convenient equipment for tinting photographs, pictures in books, art folios and the like, has been placed on the market at a nominal cost (50 cents, postage 15 cents), by L. M. Prince & Bro., Cincinnati, Ohio. Generally speaking, photographic coloring outfits are

THE BEST UNIVERSAL LENS IS

THE GOERZ



DOUBLE ANASTIGMAT

Equally useful for indoor and outdoor work, having great covering power, superb definition, and the highest practical speed for instantaneous photography. Used by expert amateur and professional photographers in all branches of the art.

Every Goerz Double Anastigmat can be used in three ways:

As a lens of universal purpose (instantaneous views, portraits, groups, landscapes, architecture, etc.).

The back lens only for taking objects at a long distance double the size the whole lens would give.

As a high-class, quick-working wide angle for a size the diagonal of which is double as long as the focus of the lens.

Catalogue on Application

C. P. GOERZ
52 Union Square, New York

abominations, but the equipment under notice is an exception. The eight colors included are scarlet, carmine, flesh tint, brown, gold, blue, rose and green, sufficing for all possible combinations, and capable of filling the average colorist's requirements for a long time. The colors come in small bottles, snugly fitted into a partitioned box. Full instructions for their use accompany each set, and the specialty is one which must surely become popular as it becomes known.

◆

La Photographie d'Art a l'Exposition Universelle de 1900, edited by C. Klary, 13 rue Taitbout, Paris. 87 pp, 8 x 11 inches, profusely illustrated. Price 5 francs. In this sumptuously illustrated souvenir M. Klary gives us the only complete description of the photographic display made at the Paris exposition of 1900. While it may be admitted that there was much poor photography shown at the exposition, it is equally evident that M. Klary has selected the examples illustrating his work with great care. The text reproduces the critiques of the show given by the principal European journals, and the pictures include examples from the exhibits made by prominent workers of the various countries represented. The collection is a notable one, and should be possessed by those desiring a record of the world's photography as seen at Paris in 1900.

◆

The AGFA booklet of facts and formulæ relating to the use of rodinal, amidol, glycin, imogen-sulphite, intensifier, and other specialties of the house of AGFA, Berlin, has met with so much appreciation that the edition of 80,000 copies sent to this country for free distribution is exhausted, and a new edition will be prepared at once.

Imogen-sulphite, the latest speciality of the AGFA concern, is now ready, and sample vials can be had on application to Anthony & Co. or George Murphy, of New York.

We are also asked to call the attention of our readers to the fact that the AGFA developers in cartridge form

CRAMER'S
Isochromatic
Plates

ARE THE MOST PERFECT COLOR-SENSITIVE PLATES ON THE MARKET

◆

Made in Three Grades of Speed:

SLOW, MEDIUM and
INSTANTANEOUS

◆

For Sale by all Dealers in Photographic Supplies

◆

Manufactured by

G. Cramer Dry Plate Co.

ST. LOUIS, MO.

OFFICES IN

NEW YORK, No. 32 East 10th Street
CHICAGO, Room 705, Cable Building
SAN FRANCISCO, Room 38, No. 819 Market Street

**Use Mallinckrodt's Sodium Sulphite Anhydrous
Absolutely Pure for Photographic Purposes**

are now packed in glass tubes. This ensures that the contents of the cartridges will reach the user in perfect condition and is a desirable improvement over the old form of packing.

◆

A little handbook recently issued by the Bausch & Lomb Optical Company, Rochester, N. Y., gives particulars of this firm's new telephoto attachment for hand cameras, an instrument of moderate power at a very reasonable price.

As noted elsewhere, R. & J. Beck Ltd., 68 Cornhill, London, have also issued a pocketbook of useful information concerning the Beck Steinheil Telephoto Lens, copies of which may be had in paper covers for one penny.

◆

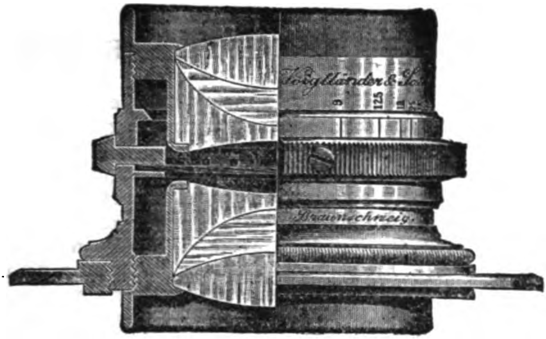
The papers on "Lantern Slides and Slide Making," contributed by Osborne I. Yellott to the *Photo American* a few months ago, and much sought after because of their practical quality, have been published in book form, at fifty cents per copy, by The Photo American Publishing Company, Bible House, New York. The book occupies about fifty pages, 7 x 10, and is illustrated. It gives in simple language and with reliable formulæ all that the slide-maker need know for successful work, and deserves a large sale.

◆

The tenth annual exhibition of the Capital Camera Club, Washington, D. C., held in the Hemicycle Hall, Corcoran Art Gallery, April 22 to 30, was more than usually interesting. In *Wilson's* for June, Mr. Charles E. Fairman gives an extended critique on the exhibition which, according to the daintily printed catalogue issued, brought together about 270 prints by amateurs residing in or near Washington.

◆

Our readers will doubtless be glad to know that Hoecheimer's gum-bichromate papers are now obtainable in this country from Mr. G. Gennert, New York, who has undertaken the American agency. Sample



The Fastest Anastigmat

If you are doing high-speed work or working under poor light, you require the HIGHEST OBTAINABLE SPEED

You Do Not Want F 7.7

You Can Do Better Than F 6.8

You Can Get F 5.6

IT'S OFFERED IN THE

Collinear Lens

**Sold by all Dealers at
Uniform Prices**

**THE VOIGTLAENDER & SON
OPTICAL COMPANY**

137c West 23d Street, New York

packages of 9 sheets 10 x 12 inches may be had for $4, together with minute instructions covering the successful manipulation of the paper.

Hoecheimer's papers are carefully pigmented and rich in color. The colors already stocked by Mr. Gennert are: engraving black, warm black, gray and sepia. They are well and favorably known in Europe, and will be found advantageous by those who do not care for the trouble of pigmenting their own paper. The sensitizing and after-manipulation follows on general lines the instructions given for Miller's process on page 415 of our *Gum-bichromate Printing* number. There are, of course, minor modifications, which may be learned from the instructions accompanying the paper.

◆

Suter, of Basle, whose name has long been connected with photographic objectives of high quality, has just introduced a new anastigmat. The combination is composed of two symmetrical achromatic lenses, each consisting of four elements, and has an effective aperture of *f*/7.2. A circular giving particulars and prices may be obtained from the American agents, Allen Bros., Detroit, Mich.

◆

The annual election of officers for the forthcoming year took place at the rooms of the Photographic Society of Philadelphia April 10th last. The following were elected: President, S. Hudson Chapman; vice-presidents, Samuel Sartain and Walter P. Stokes; secretary, Edmund Stirling; treasurer, W. S. Vaux, Jr.; directors, C. Yarnall Abbott, Prescott Adamson, John G. Bullock, George D. Firmin, W. N. Jennings, Caspar W. Miller, M.D., Chas. R. Pancoast, William H. Rau, Robt. S. Redfield, A. W. Robinson and Henry Troth.

We give the list in full because it is interesting as showing that the Salon party, formerly predominant in the councils of the society, has been "turned down," and that, for this year at least, the "other side" will have control. What they will do with the Salon remains to be seen. Shortly after the election of officers,

2 NEW ONES
SEED'S
Landscape and Portrait
ORTHOCHROMATIC PLATES

The Landscape Ortho is an ideal plate for outdoor work. It is highly sensitive to yellow and green, and will commend itself to amateurs who desire color values. Used with or without a screen.

The Portrait Ortho is now used exclusively in many leading studios. It possesses all the qualities for which the 26X and Gilt Edge brands are famous, besides its sensitiveness to color.

Both plates furnished in medium and extra rapid speeds.

Place orders with your dealer, or write us and we will see that you are supplied.

M. A. SEED DRY PLATE CO.

2005 Lucas Place, St. Louis, Mo.

NEW YORK, N. Y. : : 57 EAST 9th STREET

the former Salon committee, realizing that its usefulness was at an end, handed in its resignation to the new officers, although it had already begun the work necessary for the holding of the Salon in the coming autumn. The resignation was accepted and forthwith a new era dawned for the Salon movement. The old salons had their faults and needed reform. May the reformers acquit themselves in a way worthy of their opportunities.

❧

The photographic library gathered together in many years by Mr. Charles W. Canfield, has been purchased by Mr. John Aspinwall and by him presented to the Camera Club, of New York. The "Premier Club" thereby gains the most complete library of photographic works in this country, including files of most of the earliest photographic journals and a number of foreign works relating to photography.

We learn with satisfaction that the new librarian of the club, Mr. Juan C. Abel, proposes to index the collection during the summer and, later, issue a catalogue of the library in *Camera Notes*.

❧

The *Photographic Dealer's Annual* for 1901, 98 pp., 8x10, with many illustrations. Issued to the trade only. 50 cents. Marshall & Brooks, Harp Alley, Farringdon street, London.

This second volume of the *Dealer's Annual*, edited by Mr. Arthur C. Brooks, is as full of interest as its predecessor. In its pages the dealer will find valuable papers upon the various departments of his business, and many hints for the conserving and increasing of business. The two principal articles deal with: "How to Start a Photographic Department," and "Side Lines for Dealers," including microscopes and microscopical appliances and color photography and its requirements. The list of trade names and addresses, patents, etc., are enlarged and brought to date, and altogether the compilation is one which offers daily helpfulness to the progressive dealer.

ROSS NEW EXTRA RAPID SERIES F 5.6 UNIVERSAL

Symmetric Anastigmats

"The most generally useful Lens for the Professional or Amateur Photographer."

THESE New Lenses are aplanatic, working with the Standard aperture F 5.6, superseding the formerly popular Universal Symmetricals in consequence of their freedom from distortion and better covering properties.

No.	Equiv. Focus	Plate Covered			Prices in London
		with Large Stop	with Med'm Stop	with Small Stop	
	Inches				Dollars
1	5	3¼ x 2½	3¼ x 3¼	4¼ x 3¼	26
2	5½	3¼ x 3¼	4¼ x 3¼	5 x 4	28
3	6	4¼ x 3¼	5 x 4	6½ x 4¾	29
4	7½	5 x 4	6½ x 4¾	7½ x 5	37
5	9	6½ x 4¾	7½ x 5	8½ x 6½	45
6	11	7½ x 5	8½ x 6½	9 x 7	60
7	13	8½ x 6½	9 x 7	10 x 8	77
8	15	10 x 8	12 x 10	13 x 11	102
9	18	12 x 10	13 x 11	15 x 12	135
10	21	13 x 11	15 x 12	18 x 16	180
11	24	15 x 12	18 x 16	22 x 18	232

Five per cent. discount for cash.

The cost of pairing two lenses for stereoscopic work is $2.

The Circle of Illumination includes an angle exceeding 70°

ROSS LTD.

Manufacturing Opticians

111 New Bond Street London, W., Eng.

SOLD BY LEADING DEALERS EVERYWHERE

The photographic rooms of Messrs. E. and H. T. Anthony & Co., 124 Fifth avenue, New York, barely refitted after their fire of some months ago, were again seriously damaged by fire a few days ago. The firm has opened temporary quarters at 16th street and Fifth avenue, until their former premises are restored.

We are asked to state that the trade name of the collodion print-out paper introduced by Messrs. Anthony & Co., is the Monarch brand, not the Crown brand, as given in the notice in our last issue.

◆

The May number of *Camera Craft* (Kirk, Geary & Co., San Francisco), contains some exquisite reproductions of cloud forms as illustrations to an article on "The Birth of the Cloud," by Alexander McAdie. The frontispiece of this number, a portrait by Miss Laura M. Adams, is also notable. We congratulate our contemporary on the constantly increasing beauty and usefulness of its pages.

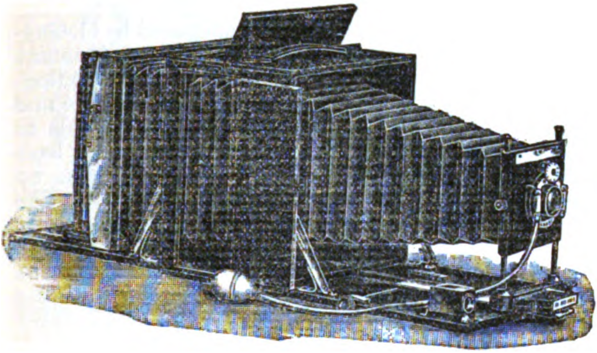
◆

Now, a little book descriptive of the facilities and equipment of the finishing department of Wm. C. Cullen's store at 61 William street, New York, is one of the daintiest pieces of trade literature received at our table in a long time. Mr. Cullen has a flourishing business among the downtown business men and brokers of the metropolis, and his booklet is well calculated for the class of men to whom he appeals. The curious can obtain a copy by application to Mr. Cullen.

◆

Mr. N. C. Hawks, founder of the California Camera Company, of San Francisco, warm-hearted, courteous, and bold protestant against trusts and similar iniquities, has retired from business in favor of his son, Mr. Birdsall Hawks. Mr. Hawks and his sons are general favorites with the trade on the Pacific coast, and their lively little magazine, *Snap Shot*, has brought them an ever-increasing list of new acquaintances. May they continue to flourish.

High-Grade Apparatus

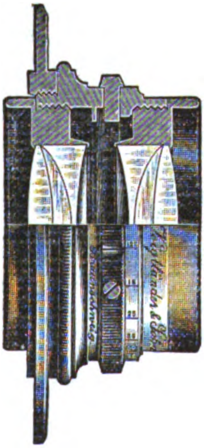


The Long Focus Reversible Back

MONTAUK CAMERA

FEATURES:

Convertible Lens, Unicum or "Auto" Shutter, Rising and Shifting Front, Reversible Back, Rack and Pinion, Double Extension Bellows.



PRICES:

Folding		Cycle	
4x5,	$40	5x7,	$40
5x7,	50	6x8½,	50
6½x8½,	60		
8x10,	70		

GRAY DAY SERIES

Fitted with

ROSS GOERZ LENSES
F 6.8 to 7.7

For Views, Portraits, Copying

OR

Collinear Lenses

SERIES II. F 5.6 to 6.3

The Fastest Lens Made

Send for Lens Catalogue *Send for Camera Catalogue*

G. GENNERT, 24-26 E. 13th St., New York

Kindly mention THE PHOTO-MINIATURE

Among the Montauk Novelties announced by G. Gennert, the Montauk Focusing Back (Hood) and Montauk Focal Plane Shutter are worthy of special mention. The first is a handy device, permanently attached to and forming part of the camera, by which it is possible to focus comfortably in sunlight and, at the same time, have both hands free. The hood is collapsible and folds up between ground-glass and the back of the camera. The Focal Plane Shutter is intended for the Reversible Back, Long Focus, and Compact D. E. Montauk's. It has an adjustable exposure slit and is adjustable for various speeds as well. The price, $15, is unusually low for a specialty of this kind.

❧

Lessons in Ozotype, by Thomas Manly, is the latest arrival in ozotype literature. It is a booklet of 36 pages, 4 x 6½ inches, and sells at 15 cents. The text takes the form of a small catechism concerning the ozotype method of making direct carbon prints, and as appendix is given a simple method (new) of producing gum prints upon the initial ozotype image, which will interest all "gum cranks."

Mr. George Murphy, 57 East 9th street, New York, the American agent for ozotype materials, informs us that so far he has not been able to cope with the demand for these supplies, but that new and larger shipments are on the way from England.

❧

The subjoined extract from Mr. Will A. Cadby's report on the French Photographic Salon (Paris, May, 1901), as given in *The Amateur Photographer*, is of interest to American workers:

The Americans are only sparsely represented; but this is to be explained by the fact that the American exhibition got together by Mr. Holland Day only closed just before the present show opened. Mr. Day himself has all new photographs here, his most interesting, from the general point of view, being the portraits. That of Madame Demachy has the distinction and taste one is accustomed to find in his work; but if it is to be con-

THERE ARE NOW IN USE OVER

234,000 LENSES

manufactured by
the Bausch & Lomb Optical Co.

This enormous number represents only Bausch & Lomb-Zeiss Anastigmat, Rapid Universal, Alvan G. Clark, Rapid Rectilinear, Portrait, and Wide Angle Lenses, and does not include the millions of simpler photographic lenses produced.

THE POPULAR VERDICT, as expressed by actual purchase and use, is that our lenses are practically WITHOUT A RIVAL.

OUR PRODUCTS ARE OBTAINABLE FROM ALL DEALERS

CATALOGUE FREE

Bausch & Lomb Optical Co.
ROCHESTER, N. Y.

NEW YORK CITY	CHICAGO
Broadway and 28th St.	State and Washington Sts.

Kindly mention THE PHOTO-MINIATURE

sidered seriously as a portrait of this really beautiful lady, it cannot fail to be very disappointing to those who know her. His portrait of Maeterlinck is interesting, and it is characteristic of the thought underlying Mr. Day's work that a crystal is introduced into the picture. It shares the onlooker's attention with the sitter, and softens the shock that those may feel who had imagined the mystic writer rather less of a robust individual. The same artist's "Puck" is as charming and satisfactory a little study of the nude as I have seen of his.

Mr. Steichen's works here generally I found a little disappointing, after those we have seen in London. They are all poetical and full of cleverness, but seemed to me hardly as strong and individual as the earlier ones. For instance, compare his wood scenes here with his now famous "Pool." But, taken with their mounts, they are always charming bits of color, look at them how you will.

Mr. Coburn has been doing fresh work in Paris, and his dainty little portraits and studies, indicative of his present surroundings, are well hung.

Mrs. Käsebier's "Young Mother" seems to me to go as far as one can with this subject. Delicate, suggestive and pictorial, and in its dainty and appropriate frame, I would pronounce it perfect.

Mr. Clarence White has six pictures here, and there is so much to be said of his originality and talent that I feel, with my limited space, I must not attempt it.

Mr. Stieglitz's "Essai à l'oxalate et au mercure" is an interesting example in platinum of double development, if I may so express it. The face of the sitter is developed with mercury and oxalate of potash—after first, of course, being covered with glycerine—giving a warm, fleshy tone, and the rest of the picture is treated with ordinary developer, giving black tones.

❧

The new catalogue just issued by the Blair Camera Co., of Rochester, N. Y., contains particulars of the 1901 introductions of this enterprising house. Among these we notice the No. 3 Folding Weno Hawk-Eye, an

Trade Mark

Actien-Gesellschaft für Anilin-Fabrikation, Berlin S. O.
Photographic Department

Manufacturers of:

AMIDOL, Patent Developer

AMIDOL is supplied in the form of fine sparkling little crystals.

AMIDOL is a **quick** and **powerful** developer bringing out **all details** and giving good **density.** The chief characteristic of this developer is its power in conjunction with Sodium Sulphite **without the addition of other alkalies.**

The bad effects of a strong alkali such as Potassium Carbonate or Caustic Potash, whether it be on the operator's hands or on the delicate sensitive material, are therefore avoided.

AMIDOL ranks in a premier position for **developing Bromide paper,** giving **excellent gradations** and the **deep blue-black** deposit so much sought after, without stain.

1 oz.	4 oz.	8 oz.	16 oz.
$ 0.75	2.75	5.25	10.—

AMIDOL, ready for use

In Cartridges or Glass-Tubes

Per box of ten, giving each 200 ccm. solution: $1.50

Pamphlet on Developers

(2d edition 1900)

Containing in 20 pages detailed description and instructions for use

Free on Application

through all dealers or importers

★ RODINAL. ★

★ EIKONOGEN. ★

Sold by all Dealers

Kindly mention THE PHOTO-MINIATURE

exceedingly compact instrument, measuring 1⅝ x 4⅜ x 7¼ inches, weighing 20 ounces, and carrying twelve exposures (film) for pictures 3¼ x 4¼ inches. The focal length of the lens is 5 inches, and it is fitted with iris diaphragm stops and pneumatic release shutter of the everset variety. Similar in design, but to our mind more useful, is the No. 4 Folding Weno Hawk-Eye for 4 x 5 plates, which is claimed to be one-half in size and weight as compared with other 4 x 5 cameras. Another attractive instrument is the Stereo Weno Hawk-Eye, measuring 1⅞ x 4⅜ x 10¼ inches, surely the smallest stereo camera yet produced. The catalogue may be had from most dealers.

◆

Mr. Chas. H. Loeber, 12 East 17th street, New York, sends to our table a new *Bargain List* containing many attractive items which must be seen to be appreciated.

◆

A certain professor of horticulture, whose name we are not permitted to mention, has recently experimented with many of the leading makes of plates for the purpose of photographing fruits, berries, etc. His verdict, plainly expressed, is that the Lovell C. D. Backed Plate is unsurpassed for this purpose, and that it gives the values of the dark and mixed reds in an altogether satisfactory way, fully performing what its manufacturers claim for it.

◆

We have just received from our printers a second edition of The Photo-Miniature, No. 17: *The Carbon Process*; a third edition of No. 6: *Orthochromatic Photography;* and a third edition of No. 11: *Developers and Development.* The two latter numbers thus reach their eleventh thousand in each case. The regular monthly edition (first edition) of The Photo-Miniature is now 5,500 copies, and the circulation of the magazine is wholly paid.

ROTOGRAPH PAPER

MADE IN FIVE GRADES

GLOSSY { A—Thin
B—Thick

MATT { C—Thin, Smooth
D—Thick, Smooth
E—Thin, Rough

"Rotograph" Paper Is a regular Bromide of Silver paper, exposed usually by artificial light and developed in the dark-room the same as a dry-plate or film.

"Rotograph" Quality It is Quality that counts, and "Rotograph" quality is the standard of excellence.

"Rotograph" Economy

COMPARE THESE PRICES:

SIZE	OTHER BROMIDES	ROTOGRAPH ALL GRADES	ROTOGRAPH SAVING
4 x 5	$0.25	$0.20	25 per cent
Cab.	.25	.20	25 per cent
5 x 7	.35	.30	17 per cent
8 x 10	.80	.70	14 per cent
11 x 14	1.60	1.40	14 per cent
20 x 24	4.80	4.20	14 per cent

"Rotograph" Samples In 4 x 5 size, including all our grades of paper, as well as sample prints on glossy and smooth surface, will be forwarded to any address on receipt of 10 cents.

"ROTOGRAPH"

B. RUSSEGGER, Selling Agent

101 Fifth Avenue : : NEW YORK

Amateurs interested in high-class photographic specialties at reduced prices should see the special Bulletin published for free distribution by Edward Pennock, 3609 Woodland Ave., Philadelphia. This list is especially rich in photo-micrographic apparatus.

❧

Mrs. A. S. C. Forbes, an enthusiastic amateur of Los Angeles, Calif., asks us to give place to the following appeal towards the inauguration of a beautiful tribute to those whose unknown graves are in the mighty sea. Apart from the intention, which is admirable, the custom offers a pictorial opportunity which should secure the support of all who live along the coasts of our country.

LOS ANGELES, CAL., *March 18, 1901.*

Dear Sir:—Last year many of the coast towns of California instituted a unique and beautiful form of paying tribute to the sailor-soldiers, whose unknown graves are in the mighty sea. The schools took active interest and bands of children marched to bluff or wharf or water's edge and cast their flowers on the face of the restless ocean, their voices blending in patriotic song with the murmur of the waves. The idea may easily become a national custom if you and all other interested and influential people will concur and assist in making it so. Will you? The idea has received acknowledgment from the White House and sincere approval from Admiral Sampson, Admiral Schley, Secretary Long and other naval officials. Yours truly,

MRS. ARMITAGE S. C. FORBES.

❧

An interesting catalogue has recently been published by the University of Chicago Press, Chicago, Illinois, including announcements of books and pamphlets, dissertations, periodicals, tracts, circulars, extension syllabi and similar documents issued by the university. The photographic interest of the catalogue centers about the department of astrophysics.

❧

Mr. J. Harry Lamson, of the Portland (Me.) Camera Club, has just returned from a photographic trip through

THE PLATES TO USE
wherever color is concerned, but especially

FOR LANDSCAPES

where the delicate values of foliage are to be kept and for

TELE-PHOTOGRAPHY

where clearness is desired in the long-distance view and

FOR ALL OUTDOOR WORK

LOVELL
COLOR DIFFERENTIATING
PLATES

May be had "backed" on request in two speeds
C.D. "FAST" and C.D. "MEDIUM"

Positively the best orthochromatic plates in the market. Sensitive to the entire spectrum; giving brilliant negatives; simple in manipulation. A trial will convince.

OBTAINABLE FROM DEALERS OR DIRECT FROM FACTORY
SEND FOR PRICE-LIST AND SPECIAL CIRCULAR

LOVELL DRY PLATE MFG. CO.
NEW ROCHELLE, N. Y.

Western Depot: 64 Wabash Avenue, Chicago.
Denver: Hart Bros. & Wells.

Kindly mention THE PHOTO-MINIATURE

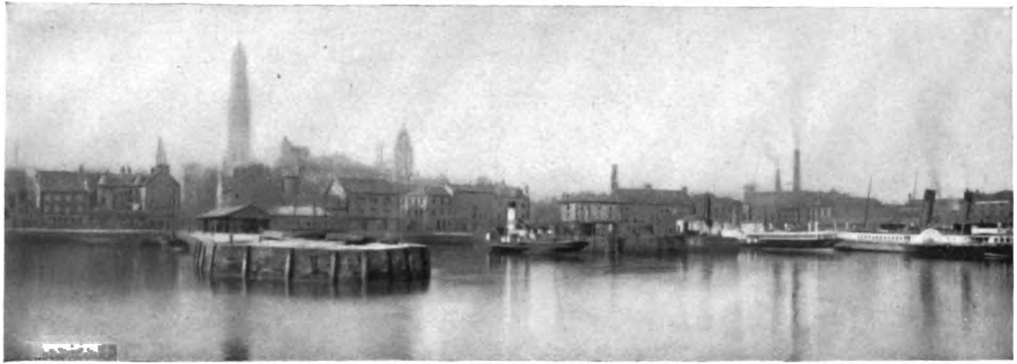
the island of Jamaica, which he asserts to be a veritable land of promise for amateur photographers. In a later number Mr. Lamson will briefly describe Jamaica as a photographic field for the benefit of our readers.

◆

"Aristo Eagle" is the title of a new photographic monthly, edited by Mr. T. W. Pattison, and published by the American Aristotype Company, Jamestown, N. Y. Although published in the interests of American Aristotype paper and supplies, the journal must take its place as one of the brightest of its class, and Mr. Pattison deserves great credit for his work in its pages. It offers many well-illustrated articles of professional interest and will undoubtedly be welcomed by the fraternity to whom it is addressed.

◆

A few copies of the "Abridged Catalogue for 1901," issued by Ross Ltd., London, and mentioned in our last number, have been received. Readers interested in Ross lenses may obtain copies on application as long as the supply in hand lasts.



2¼ x 6¼

OLD WEST HARBOR, GREENOCK
The view, made with a No. 11 needle-hole, includes an angle of 1000
J. B. Thomson

The Photo-Miniature
A Magazine of Photographic Information
EDITED BY JOHN A. TENNANT

Volume III JUNE, 1901 Number 27

PINHOLE (LENSLESS) PHOTOGRAPHY

Three hundred years have gone by since Giovanni Battista della Porta, mathematician, physicist and litterateur, invented the "pinhole" camera, for the delight and wonder of the people of his day. Since which time men have sought out many inventions—especially in photography. But if that versatile master of many sciences could have added the gift of prophecy to his other accomplishments, it would surely have surprised him to think that, after the lapse of three centuries, the discovery by which he delighted the world would be still in its infancy, unknown and unappreciated, at least as far as its practical applications and the recognition of its pictorial possibilities are concerned. And yet, explain it as we may, the old Neapolitan's invention has never been taken seriously, even by those who count themselves enthusiasts in photography—that art which gives us picture images direct from the face of nature, sketched by the pencil of light unaided by mortal hand.

Of "pinhole" photography as we know it Porta knew nothing save the wondrous images given in his camera obscura. It was his glory to point out the way. Photography with its delightful complexity came after him, and his camera became but an accessory to the lens which his followers substituted for the "pinhole," recognizing the lens as an improved means of obtaining picture-images, an instrument greater in its capacity and more interesting in its possibilities than the "pinhole." Thus the lens was given first place in the formation of images, which place it holds to-day, the object of supreme interest and importance in photography.

Neglected and laid aside with the handpress and handcut types of the old printers, the "pinhole" was not completely forgotten. Just as, to-day, the handpress and original type faces of the earlier printers are recognized as still worthy of no mean place in modern typography, so photographers have taken up the "pinhole," and there is a new interest in its performance. We have heard so much of the photographic lens, and have so completely depended upon it in our picture making, that there is a pleasant fascination in the idea of making photographs without a lens. The desire to know more about this lensless photography has grown steadily of late years, and the happy results gained by latter-day enthusiasts have further increased public interest in the subject. Now we are to have a little book wholly devoted to "pinhole" photography, with pictures in the making of which the lens had no part. It will be a new field for most of us, but I am sure that we will find pleasure in it and, as usual, many things worth knowing.

Some months ago there appeared in *Photography* an illustrated report of a lecture on "Pinhole Photography," given by the Rev. J. B. Thomson, before the Camera Club of Greenock, Scotland. It was evident, from the way in which Mr. Thomson handled his subject, as well as from the illustrations accompanying the paper, that he had mastered his peculiar field, and could tell its story simply and plainly. The paper awakened so much interest and enquiry that, after some persuasion, Mr. Thomson consented to give us an account of his hobby for The Photo-Miniature. This little book, therefore, is his from beginning to end. It is all that I desired, and I am happy in being permitted to publish it for the pleasure and information of photographers everywhere.

It is impossible to enter upon any serious consideration of photography without a lens and not protest against the unreasonableness of the use of the word "pinhole" to describe this branch of photography. Thus the first thing we must learn about the so-called "pinhole" photograph is that it is not made through, with, or by means of a pinhole, but ordinarily by means of a needle-hole or other minute aperture pierced through a thin sheet of metal, card or paper, which hole serves all the purposes of the lens in the formation of the picture image. Lensless photography would, therefore, be more correctly descriptive than "pinhole" photography.

In the beginning of his manuscript Mr. Thomson made a plea for the remedying of this error in nomenclature, and suggested the word "Rectigraphic" as a substitute for the more familiar though erroneous "pinhole." To talk about "rectigraphic photography" in America, however, where we have photographic lenses well known by that name, would be to confuse the reader. I have therefore chosen to follow the more direct way, and put the description of the thing under discussion first, concluding with the plea for better nomenclature when the reader has acquainted himself with the thing to be named. EDITOR.

The Apologia of the Needle Hole

In view of the apathy which has long prevailed concerning lensless photography, it may be well, before we enter into the practical details of its manipulation, to set down in a plain way some of the claims made for "pinhole" photography. The means employed are simplicity itself. Let no one, however, be misled by the absence of show or elaboration. The results obtained by those who are minded to make trial of the method are all that they can need in order to convert them into believers, if not enthusiasts. This we will see as we go along.

Truthfulness

To come to the point, the first excellence of lensless photography which we would name is its preëminent truthfulness. In this respect no known image-forming device can compare with the needle-hole. In its action the light passing through the little aperture is literally rectigraphic. No lens we know, however composed or corrected, is absolutely rectilinear under all tests. The needle-hole *is*. Rightly used, it renders the lineaments of objects with geometrical accuracy, exactly as perfect human vision perceives them.

Focusing not Necessary A second advantage of "pin-hole" photography lies in the eliminating of the focusing difficulty. With a lens this difficulty is constantly asserting itself, and we are made to feel that we are hampered by very positive limitations. For each given distance there is only one point at which the lens will work, and only one size of picture-image that it will give. With the needle-hole these limitations quite disappear. Here there is no call for nicety of adjustment—in fact there is no need to think of focusing at all, except in so far as it affects the inclusiveness of the picture.

Angle of View A third notable advantage is the width of angle obtainable. The needle-hole will include a much wider angle than any ordinary photographic lens will do. A good wide-angled lens will do well if it takes in an angle of 70° or 75°; but with the needle-hole it is quite easy to work at an angle of 130° or even more.

Equality of Effect One more point of advantage for the needle-hole lies in the equality of effect which it gives in all parts of the picture. It must be a good lens, indeed, that will produce a picture quite equal all over. But the needle-hole gives us this in all cases. In fact the needle-hole at once puts out of account all the drawbacks that we associate with lenses—curvature of field, distortion, achromatism, astigmatism. Consequently the definition is just as good at the outermost edge of the picture as it is at the center.

Other Qualities So much for mechanical considerations. What now about the quality of the work produced? We are aware that the common idea in this matter is one by no means favorable to lensless photography. It is of course known to all that a picture of a sort can be got through a needle-hole. But the general impression seems to be that the effect obtained is at best but a blurred or fuzzy suggestion of a photograph. This is a very mistaken notion indeed. On the contrary, the needle hole will give pictures that not only fulfil the technical requirements of a good photograph, but have distinct artistic qualities of their own. I admit, of course, that we do not get in a needle-hole photograph that hard, uncompromising sharpness which a well-made lens, perfectly focused, will give (and without question that sharpness is a recommendation in dealing with certain classes of subjects where a mechanical result is required). But, on the other hand, the needle-hole will give a moderately vigorous definition, and it will give that in alliance with qualities which are esthetically valuable, and which we cannot have in the "dead-sharp" photographs people of an extremely matter-of-fact mind delight in.

About Definition

Definition carried to the extreme of sharpness has decided drawbacks, especially in dealing with nature-subjects, where we want to obtain more or less pictorial effect, in atmosphere, in harmony of tone, in that softness and suggestiveness which give the imagination room to exercise itself, and which constitute the element of poetical interest in a picture. I make bold to assert that we do not find anywhere in nature that uncompromising sharpness which so many amateur photographers strive after. The impression produced upon our minds is never that of hard definition. I have in my mind's eye a kind of photograph, specimens of which we have seen by the score, and of which the producers have been proud. The lens has been stopped down to the smallest aperture; the focus has been adjusted to a hair's-breadth, and the exposure carefully made. And what is the result? A picture which is a triumph of clean-cut lines. Each detail, near and distant, is there, making an equally obtrusive claim upon the eye. It is a wonderful assemblage of accurately portrayed *minutiæ*. But that is all. As a picture it is soulless. It is perfectly flat, without a suggestion of depth or distance. It has no atmosphere and no breadth of effect. In the universal assertion of detail there is nothing left for the imagination—none of that mystery which makes a picture interesting. The softness of nature, in fact, is absent, and when you have seen it once you do not want to look at it again. This fault, which is observable in the majority of photographs, is largely responsible for the lack of interest in the average photograph.

Getting Nearer to Nature

Now, in a good needle-hole photograph it is not too much to say that we have an effect much nearer to nature. If we have not every object far and near presented with the same minuteness of detail that we mentally *know* the objects to possess, we have much more nearly the vision (if we may so speak) which actually meets the eye. We have atmosphere and the right impression of distance. By the softening down of detail the really important lines and characteristic masses retain their natural prominence. And, what is still more important, we have what we may call *plastic quality*—that quality which makes objects stand out bodily and not merely appear on the flat. The picture suggests much more to us just because it does not pointedly express everything, and we can look at it again and again with the feeling that we have not seen all that is in it.

The principal drawbacks of lensless photography is that we cannot do snap-shot work with it, and it is practically of no use in picturing moving objects. The realm of still life is its proper sphere and scope. But in that wide realm—and it is a wide one—the needle-hole has a use and a variety of adaptation which at first sight we would hardly think possible.

An Inexpensive Hobby

Any account of the claims of lensless photography would hardly be complete without a reference to the cheapness of the apparatus. Some may indeed make the objection that in a question of art the matter of mere expense has no right to be considered. If the question were one of cheapness *versus* art, the objection would be perfectly valid. If only second-class results could be obtained, the cheapest apparatus would, from our point of view, be dear. But that is not the situation. As the most costly "brass and glass" will not guarantee the production of an artistic photograph, so, on the other hand, neither will the entire absence of "brass and glass" shut us out from the obtaining of an artistic photograph. And when, in view of this, we remember that photography is not for the wealthy few, but a hobby of the most democratic sort, then the question of cheapness is one of very great importance indeed. In lensless photography the expense is almost purely one of plates. The price of the necessary outfit is so small as to be scarcely worth considering.

The Apparatus In proceeding to the practical part of our task, I must begin with an exposition of the necessary apparatus and how to make it. In almost every other branch of photographic work dealt with in earlier numbers of THE PHOTO-MINIATURE the necessary apparatus has been obtainable as a commercial article, and the only question has been how to make the best use of it. In the case of lensless photography the circumstances are quite different. What we need is not on the market, so far as we know, unless perhaps in toy form, and he who would enter the field of photography without a lens must needs be the fabricator of his own camera. I make no excuse, therefore, for going into detail and giving minute directions about all the practical points.

Of course, to a certain extent, the ordinary camera is capable of being made to serve our purpose. Indeed, in being applied to our branch of the art the ordinary camera would find for itself an even wider scope and adaptability. All its mechanical niceties would be equally applicable, and the bellows would be of much greater use than in common work, owing to almost limitless elasticity of "focus." If any of my readers possesses an ordinary camera, let him simply substitute a needle-hole for a lens, and he is ready for work.

I do not, however, recommend the ordinary Camera for use with the needle-hole. It is not only expensive, but it is too limited in the variety of photographs it will take. In all respects, such a box as I shall now describe is preferable. If it is less imposing it has a far wider range of usefulness. Moreover, it accords well with the simplicity of lensless photography that the whole apparatus should be homely and devoid of elaboration. Needle-hole work is *par excellence* an art for the amateur; and while the professional must for business reasons, concede something to show, and must impress his public by having all the up-to-date aids which the optician can give him, the amateur has no such considerations to hamper him. It seems natural that the needle-hole worker should make his own apparatus, and he will certainly enjoy his work much more if he does. Of course not a word is here said against exterior attractions if these are desired, but they are in themselves no advantage. Art despises no means, however unimposing, if it can only by that way reach the coveted goal. I will, therefore, in what follows, simply name the essentials. Those who like show or daintiness can have it "after whatsoever flourish their nature will," while those who are mainly concerned about results can have these on very inexpensive and unexacting conditions hereafter detailed.

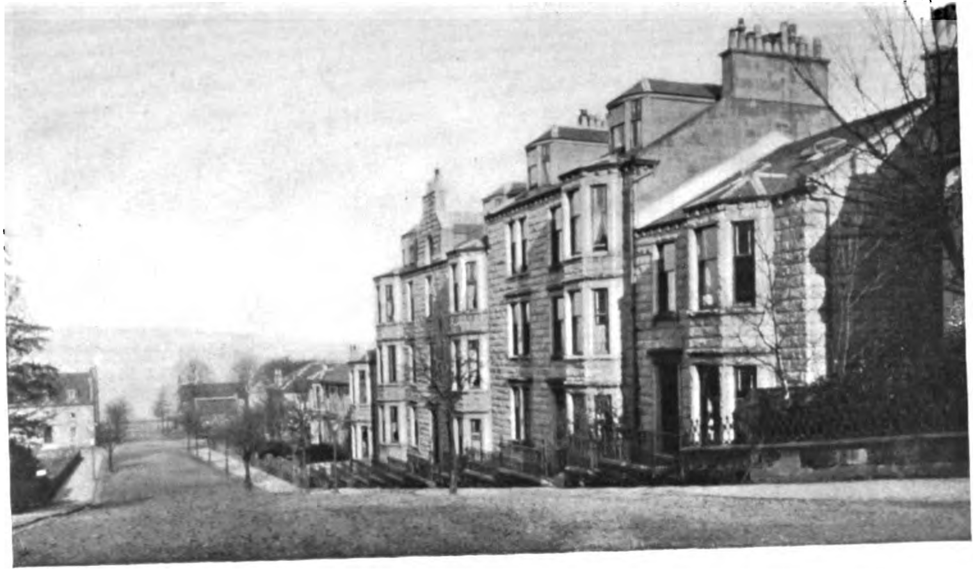
The Camera

The first essential is a box thoroughly light-tight. Let the exclusion of the light be secured by any device you please; only see that no faintest ray can reach the interior, when the box is closed, except through the needle-hole. It is good to have the lid detachable by some simple arrangement, as in this way the necessary operations within the changing bag are more easily managed. Let the box be slotted within to receive and hold plates, and be careful to have the slots opposite and equally distributed on either side, so as to have the plate squarely facing the aperture. Two removable partitions of cardboard may be inserted at suitable points as guides for handling plates in the dark. The dimensions of the box will be according to the plates used. The half plate, 6½ x 4¾ inches,* is, for a variety of reasons, the most suitable size; certainly it lends itself to more forms of work than most others. Of course in a box made to suit this size smaller plates, such as 4 x 5, are usable as well, by carrier. This size, then, is kept in view in the following specifications: Inside measure 6½ inches broad x 4¾ inches deep (allowing for any light-excluding arrangement, and easy measure so as to let the plates be slipped in or taken out without difficulty); the length inside to be 8 inches, and the whole interior colored with dull black.

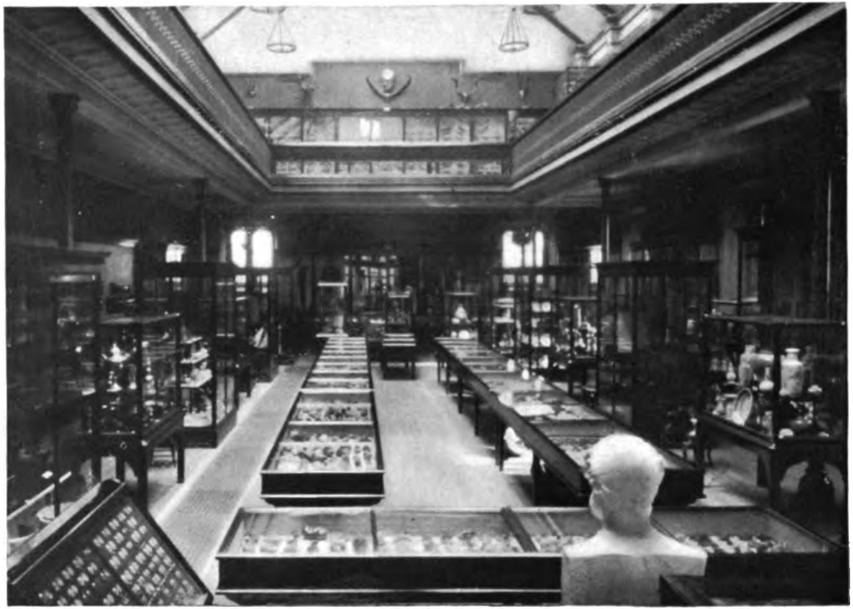
In preparation for the necessary apertures, bore at the

---

* In America 5 x 7 inches, although the English "half plate" is obtainable here from most dealers.—*Ed.*



BENTINCK STREET, GREENOCK
Made with a No. 10 needle-hole
J. B. Thomson



3½ x 5

THE WATT MUSEUM, GREENOCK
Made with a No. 11 needle-hole
J. B. Thomson

front end of the box four holes of ⅜ inch diameter, thus: One exactly opposite the center of the plate; another 1⅝ inches to the right of the central hole; another the same distance to the left (these for stereoscopic purposes, 3¼ inches apart); and another an inch or so above the central hole—this for ordinary landscape or view purposes, cutting off unnecessary foreground and giving more "headroom," just what we gain by a rising front in the ordinary camera. Let all these holes be countersunk *inside* the box so as to allow of a free spreading of rays from the needle hole. Continue the countersinking until the wood at the edge of the holes is not more than one-sixteenth inch thick. We are now ready to consider the shutter.

The Exposure Shutter

Where an ordinary bellows camera is applied to lensless work, an ordinary shutter, such as the "Thornton Pickard" or other pneumatic ball shutter, may be used. Only, as time exposures alone are wanted, it need not be of an elaborate or expensive sort. Such a shutter, however, would be quite unsuitable to the box we are recommending. Owing to the number of holes to be provided for, no one shutter would meet the needs of the case; and as the apertures are comparatively near each other, there would not be proper room for the number required, not to mention the clumsiness and expense of the arrangement. We must, therefore, fall back upon something simpler. Of the various devices available, the neatest and the most efficient is the sliding shutter, the making of which we shall now describe.

We have four apertures to deal with. Two of these, for stereoscopic work, are a pair to be taken together, as they must be opened and closed simultaneously. As, however, this pair and the central hole are all in a line, a little ingenuity will enable us to make one shutter answer the needs of the three. To accomplish this the procedure is as follows:

Take a flat and perfectly smooth piece of some thin, bendable metal—tin, zinc, brass or aluminum. Cut a strip 5¼ inches long and ⅝ inch broad, taking particular care that the edges are perfectly parallel, so that the shutter may slide smoothly and evenly when finished.

Cut another strip 4¼ inches long and 1 inch broad, taking the same pains to make the edges parallel and the ends square. Into each edge of this broad strip make four cuts at right angles, ¼ inch deep, two of them being, respectively, 1 inch from either end, the other two being ½ inch on either side of the middle. Now lay the narrower strip along upon the broader one, so that the latter shows an equal margin on both sides of the former. For a reason which will presently appear, a narrow strip of paper had better be placed between. Grip the whole firmly and evenly together in a vise or otherwise, and carefully bend over three pieces of the broader strip, as in the following illustration (Fig. 1), the shaded parts being those bent over. See that they are bent equally and are made to lie perfectly flat, forming slots in which the narrower strip AB, which is to form the shutter, may slide easily yet not loosely. At this stage the shutter will be tight; but when it is carefully withdrawn and the paper slip removed it should be just about right. The parts not bent over will now be rounded at the corners, pierced and countersunk to receive the screws by which the shutter is fastened to the face of the camera.

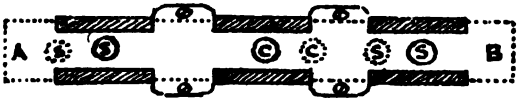


FIG. 1. DOUBLE ACTION SHUTTER

C is the central aperture. S S indicate the apertures for stereoscopic work

The making of the apertures in the sheath is the next process. To do this withdraw the shutter, which has to be dealt with separately. Mark the central point of the sheath, and lay off with the compasses two other points each 1⅝ inches from this central point. The three centers will thus correspond exactly with the three needle holes. Drill at each an opening ¼ inch in diameter, and the sheath is finished.

The holes in the shutter have of course to be arranged differently; that is, so as to permit exposure through the stereoscopic *pair* or through the central *one* at pleasure. They must also be arranged so that at no point in its movement shall the shutter expose even in a passing way through all three apertures at once. This, however, is a very simple problem. Here is the solution. For the stereo pair of holes, proceed as follows: Having first turned up a tiny bit at the (A) end of the shutter to act as a stop and enable the finger to move it easily, push it in as far as it will go. Turn it face downward, and through the *stereoscopic* holes of the sheath drill two holes in the shutter exactly the same size. Turn up also a bit at the (B) end of the shutter. Press it home from that end. Again turn it face downward, and through the *central* hole of the sheath drill a corresponding hole in the shutter. The holes in the shutter will now appear as shown by the dotted circles in the diagram, and the effect will be that when the shutter projects an equal distance at both ends of the sheath all the holes are closed. When it is pushed in from the (A) end a stereoscopic exposure is made; when pushed from the (B) end a central exposure is made. There need be no mistake in the actual operation, as a glance will show how the holes lie, and which way the shutter must go to give the exposure desired.

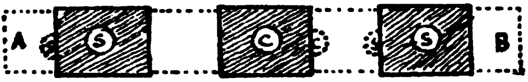


FIG 2. CARDBOARD SHUTTER.

The upper or "rising front" shutter must now be made. It should be identical with the middle section of the shutter we have described.

A Simpler Form

A still simpler and quite as efficient a way of making the necessary shutters is by taking fine hard cardboard for the sliding parts, and tough writing paper or the like for the sheaths. In this case the sheaths are folded over the shutters from front to back and glued on to the face of the camera with some strong adhesive, such as seccotine—the whole being blackened in some suitable way. See Fig. 2.

The Needle Hole

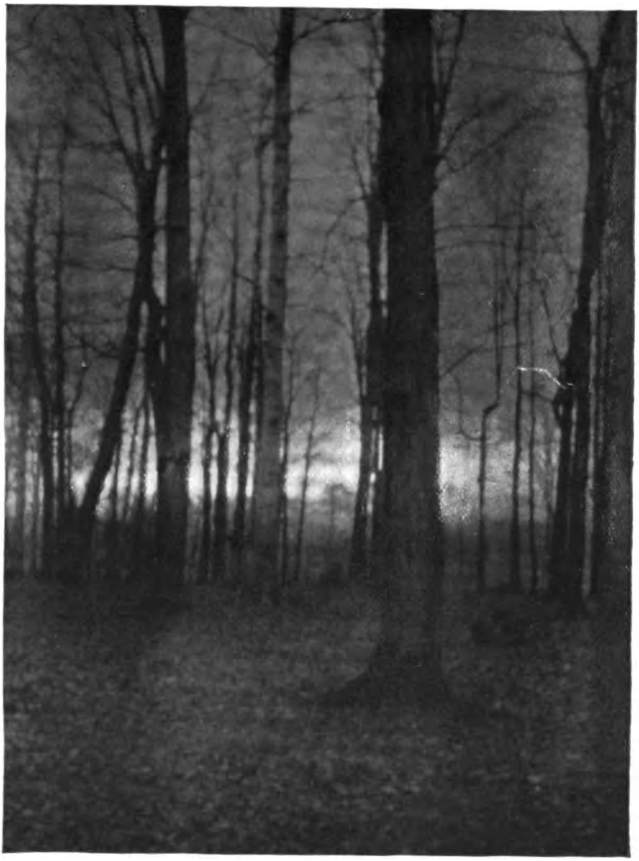
The shutters thus completed, we are ready for the most important and critical part of our work, the making of the needle holes. I say advisedly "the most important and critical part"; for, as in an ordinary camera almost everything depends upon the quality and character of the lens, and science, ingenuity and money are willingly laid under requisition to secure a flawless and perfect-working article, so in our camera the highest and most characteristic results can only be obtained where the needle hole is made with extremest care. The little aperture must be in its own way a work of art, and it is hardly possible to take too much trouble to render it perfect. The carefulness given to this will surely be more than repaid by the resultant quality of picture work produced.

Essentials in Apertures

Before we proceed with the preparation of the aperture for our purpose, let us note what it is that we want. To begin with, we want a hole *very small* in its area—so small that it will permit only the most delicate pencil of rays from each point of the object or view to pass through; for if more than the most delicate pencil is provided for, the streams of rays coming from contiguous points in the view and spreading as they go would overlap each other by the time they reach the sensitive plate, and so would make a hazy impression somewhat at the cost of vigorous definition and clearness of detail.

Then, again, we want a hole *perfectly round and clean*, without any irregularity or raggedness to interfere with the equable distribution of the rays. If this is not secured, the consequence will at once be seen in the inequality of light and of definition in the different parts of the plate. The slightest raggedness or standing up of the metal at the edges of the aperture will inevitably issue in a falling away of quality toward the ends of the picture. If one side of the aperture is rougher than another, the section of the picture produced by the rays passing over the faulty part will quite obviously be less satisfactory, simply because that section is not getting its proper share.

A stereograph made with No. 10 needle-holes
J. B. Thomson



3½ x 4¾

AUTUMN WOODS
A "pinhole" photograph
F. C. Baker

Influence of Thickness

Then, once more, we want a hole *whose edges are extremely thin.* This is a condition quite as necessary to the perfection of the needle-hole as any other. In fact, it is quite vital, and that for two distinct reasons. In the first place, an aperture with very thin edges is essential to the production of a picture having any considerable width of angle. It matters not how thin the material through which we make the desired opening, the needle-hole is just a little tunnel; and the longer the tunnel is, i. e., the thicker the metal at the edges of the hole, the more limited is our angle of view. When one thinks how very minute the aperture is—say from $\frac{1}{60}$ to $\frac{1}{30}$ of an inch in diameter—it is easily apparent at what a small angle the rays begin to get cut off and the view restricted. Let us figure it on paper (enlarging, but keeping the right proportions) (Fig. 3), to make clear to our minds how it works out. Suppose our metal is $\frac{1}{30}$ of an inch in thickness, and our aperture $\frac{1}{60}$ of an inch—just about the size made by a No. 10 needle—and suppose the metal is drilled clean through the full thickness, the result would be as shown by the lines A, B—giving an angle of something under 50°. With the same thickness of metal a No. 11 needle-hole would restrict the angle to perhaps 30°.

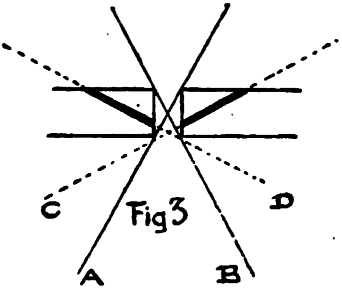


Fig 3

But suppose that, by countersinking, the metal at the edge were reduced from $\frac{1}{30}$ to $\frac{1}{90}$ of an inch as shown by the very dark slanting line, then at once the angle would be enlarged very greatly (as shown by C, D); it would now be about 125°, and with a No. 11 needle it would be probably about 100°. Thin edges, then, are needed to enable us to avail ourselves of two of the greatest advantages of needle-hole photography, its elasticity of "focus," and its capability of working at a wide angle, including a larger amount of view.

Reflection

But there is a second reason quite as important as this—that one must reduce as far as possible the *reflection* of rays from the interior of the needle-hole. Unless such reduction is carefully made there is an element of confusion left which is bound to operate hurtfully upon the quality of the picture. We have not only the rays which are wanted—the rays that pass directly through the aperture to the plate and produce the photograph, but we have rays that are not wanted—those which impinge upon the sides of the aperture and are deflected from their natural direction to another part of the plate, where they can only produce mischief by competing with the rays which alone have the right to prevail there, and so detracting from the crisp clearness that is aimed at. A glance at Fig. 4 will convincingly demonstrate the truth of this. Here we have not only the direct pencil of rays A A passing through to produce the desired impression at its own proper

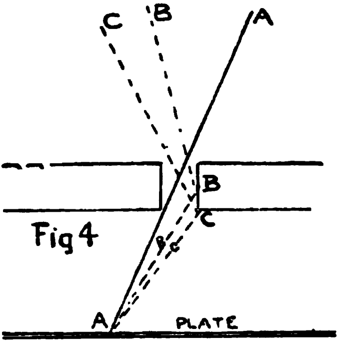


Fig 4

place, but we have pencils of rays, like B B B and C C C, coming from quite different parts of the view, getting reflected from the side of the aperture, and arriving at the same destination on a conflicting errand. As long as the reflecting surface is allowed to remain and do its work, there can be but one effect produced, and that is to reduce the beauty and convincingness of the picture; for the same process of competition is at the same time going on over the whole surface of the plate. And the smaller the aperture is, in proportion to the thickness of the metal, the more hurtful the competition is — for, while the reflected light continues of the same power, the direct and really valuable light is weakened, and is therefore less able to hold its own.

Now let it not be said that this is "much ado about nothing." That is not the case. If one thinks how very small is the aperture through which the direct and desirable rays have to pass, one must see that, even where comparatively thin metal is used, the reflecting surface must be great *in proportion*. Indeed, I am convinced that one of the prime causes of failure or of disappointing results lies in the non-recognition of this element.

Of course, however thin we may make the edges of the aperture, there will always remain a certain amount of possibly reflecting surface, as may be seen by examining a needle hole slantwise against the light with a magnifying glass. But the hurtful effect of what remains can be reduced almost to *nil* by a process of judicious blackening and dulling of the edges. If all other things are right, as described in the foregoing paragraphs, and the reflection effectually eliminated or neutralized, there is no reason why pictorial effects of exquisite beauty should not be obtained from the needle-hole with a pictorial subject.

The Making of the Needle-Hole

After this somewhat long but very necessary discussion of the essentials of a good needle-hole, we come to the practical question, How to secure the points named? The foremost consideration is the kind of metal to be used. The *desideratum* is some metal not too hard or difficult of perforation, yet with a certain measure of tenacity and firmness so as not to allow of the aperture being too easily damaged. Tin-foil has some features to commend it. Its great thinness is a valuable element, as enabling us to secure an aperture whose edge is reduced to a minimum. It can readily be obtained as thin as $\frac{1}{3000}$ of an inch. Tinfoil may thus at times be desirable for special purposes; but its fragility is so great as to discount its use if anything better is available. Aluminum and silver have also good qualities, but perhaps the best of all are soft copper and brass; and either is easily obtainable of the sort required.

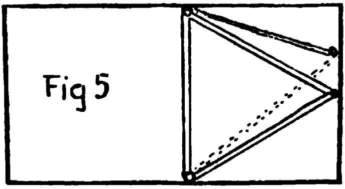
Cutting the Aperture

Various methods of making the aperture in such metals have been suggested in photographic journals. I simply give the plan which I have found most satisfactory in my own experience.

Take a small piece of thin flexible copper or brass about one-half inch square. In the center press firmly with some hard rounded point, so as to make a little hollow on the one side and a little boss on the other. Still better is it to use a little Archimedean drill until a boss appears at the back of the plate. Rub down this boss on a fine stone until the level is reached. In the center of this small circle you have thus a spot where the metal is capable of being very easily pierced, while the portion surrounding it is comparatively strong. With a sharp, fairly stout needle fixed in a cork or in a handle of wood about the thickness of a pencil (all the needles used must be so fixed, especially the very small ones, which are most difficult to manipulate otherwise), press from the center of the hollow until *just the point* is through—the plate meantime lying flat on a level piece of lead, wood or cardboard. If the tiny hole is examined now with a highly magnifying glass, such as a Coddington lens, it will be found that ragged metal is standing up all around. *Cut* this off with a sharp penknife. Now begin to use the needle by which you want to measure your aperture—say a No. 10 or No. 11, as may be desired. Cautiously and gradually widen the hole with it, repeatedly examining your progress with the magnifying glass, cutting off all ragged parts, reducing still further the thickness of the edges, if necessary, by rubbing on the stone and inserting the needle carefully from both sides until you have a hole strictly of the size aimed at, perfectly round, perfectly clean, and as thin in the edges as it can safely be made.

Dulling the Edges To dull the brilliancy of the edge and neutralize reflection, a very good way is to expose the needle-hole on either side to the flame of sulphur. This process has the advantage of not affecting the size of the aperture, and it seems to be quite effective. Another way is to heat the plate in the flame of a spirit lamp and quickly plunge it into a solution of nitrate of silver. But if any one of our readers knows a better plan than either of these, by all means let him use that.

Fixing the Plates The little plate thus finished should now be fixed between two small squares of gummed paper in which circular holes ⅛ of an inch or so in diameter have been punched. The margins of postage stamp sheets supply excellent material for this. When the four necessary plates have been prepared as above, all that remains to be done is to secure them in their proper positions behind the holes of the shutters, to adjust the shutters in position over the respective holes in the camera to which they belong, and to fix them firmly in their places—every precaution being taken to insure that the fitting is air-tight—and the camera is ready for use.



A Finder Before we pass from this constructive section, it is necessary to refer to one or two accessories which we shall have occasion to use, such as finders and the like.

The ordinary box camera is not complete without a *finder*. For our purpose, however, the usual style of finder is of little service. It is indeed useful now and then for centering one's picture, especially when we are photographing a single object, but owing to the vast range of choice as regards the inclusiveness of our picture which the lensless camera gives, the finder is of no value at all as an indicator of what we have on our plate. The difficulty of accurately delimiting our view can, be met in a very simple way (Fig. 5). Put a small pin into the lid of the camera just immediately over the aperture, and other two at points corresponding to the ends of the plate as it stands within the camera. Slip over these a thin India rubber band, so as to make a triangle, and by looking along the two sides you see to a nicety exactly the amount you are taking in. You have, in fact, the strict angle of view. If the camera is tilted on to its side, and one of the stereo apertures is being used for photographing some lofty object, such as a church with a high spire, the band would be arranged as in the dotted lines. These arrangements, if made according to direction, are absolutely reliable for all purposes.

Accessories are also required for stereoscopic and panoramic work. Diagrams will show better than words what form these should take.

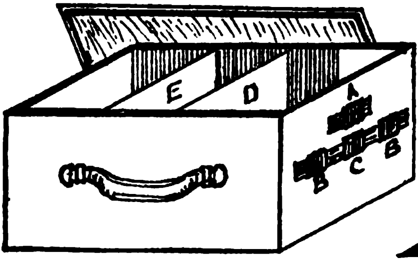


FIG. 6.

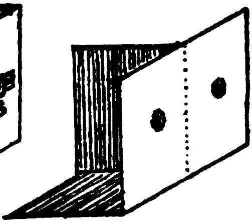


FIG. 7.

Fig. 6 shows the general arrangement of the camera. A, the upper shutter; B, the stereoscopic; C, the central; D and E are movable partitions.

Fig. 7.—The Stereoscopic Accessory. It is set into the concave so as to divide the plate into two sections. The central partition must be made according to the plate distance desired.

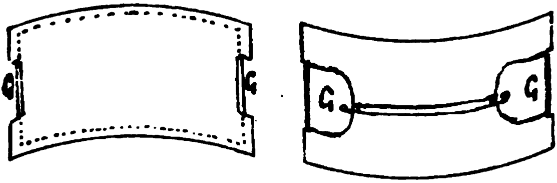


FIG. 8.

Fig. 8.—The Panoramic Accessory. The front or concave view shows the film held in position by the grippers G G, which are small clutches of tin or zinc joined at the back by an India rubber band.

This Accessory is made of stout tin or zinc carefully curved to *the radius of the plate distance*. The central part between G G should be *exactly the length of the film*. The other parts should overlap at each end just enough to let the whole accessory slip into the slots at the sides of the camera.

Principles Before Practice

Having thus completed our apparatus, we may, of course, at once begin the use of it. But if we are to do so in an intelligent, not to say artistic, way, we must postpone practical work until we have considered certain general principles.

In the study of lensless photography there are three preliminary questions which require to be taken up. There is, first, the question of *apertures*—What are the characteristic effects of different sizes, and why should this or that size be preferred? Then there is the question of *plate distance* and the facts upon which it depends. Finally, there is the question of *exposures*.

Apertures—What? and Why?

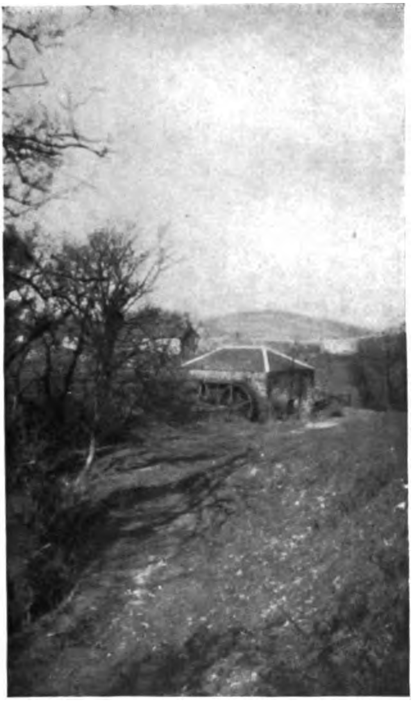
The impression made by light passing through an aperture, of whatever size, always reveals this phenomenon, that there is a distinct edging or margin of diffusion. This is equally true of lenses and needle holes; it is one of the facts which the optician takes account of, and endeavors by correction to reduce to a minimum. It has been calculated by scientists that this margin of diffusion bears a definite and constant proportion to the size of the aperture, and amounts, in fact, to one-half of its diameter. That is to say, the diffusive edging always equals the *radius* of the aperture, so that a large aperture has a comparatively large margin, and *vice versa*. As this cannot be eliminated in the case of the needle-hole, there is always associated with pictures produced in this way a characteristic softness; and of course the degree of softness depends directly upon the size of the aperture. Up to a certain degree it is a pleasing effect, and is one of the sources of that artistic quality and inherent naturalness which belong to lensless photography. As we have already endeavored to show, this softness is pictorially a merit, a reproduction of what really appears in nature, and appeals to our æsthetic sense. Ruskin has this in view in another of its applications, when he says: "All great work is indistinct . . . Excellence of the highest kind without obscurity cannot exist." But, of course, there are limits that have to be recognized. An excess of softness runs to meaninglessness, through loss of definition. Hence the necessity of setting very positive bounds to the size of our apertures.

With regard to the diffusive margin, there is one point to be carefully noted. The experts tell us that this margin does not increase as the plate recedes from the aperture. The effective rays which produce the picture spread as the plate is set further back, with the result of giving greater magnification of objects; but *the margin of diffusion remains unmagnified.*

Now this has an important bearing upon the reproduction of delicate detail. The *percentage* of effect produced by the margin of diffusion grows smaller as you bring your plate back. Hence (provided nothing else interferes) if we use a very small aperture, with a correspondingly minute margin, we may, by a judicious "receding" of our plate, reach a point at which the effective rays so far predominate as to put the margin of diffusion almost out of account. With a larger aperture this is not so easily accomplished. Hence, *prima facie*, delicate detail in definition will be the better produced the smaller the workable aperture you use. This is a fundamental principle in "pinhole" photography.

Carrying Power of Light

In this connection, however, other considerations come in to affect our conclusion as to the degree in which it is desirable to reduce the aperture. For one thing, we have to remember that there is a very



THE MILL
Made with a No. 12 needle-hole
J. B. Thomson

FLOWER AND LEAF STUDIES
Made with a No. 12 needle-hole
J. B. Thomson

decided limit to what we may call the "carrying power" of light. Actinic light loses in impressive force according to the square of the distance from the aperture. Hence, if the aperture is reduced beyond a certain point, the very small pencil of rays admitted would possibly take a longer time to register its due mark than the worker would care to allow.

Then it must also be remembered that the smaller the aperture the greater is the effect of reflection from the edges of the hole, because the number of reflected rays is so much the greater *in proportion* to the direct rays. Of course, as we have seen, means are taken to reduce or neutralize that reflection; but it is safer always to reckon upon it as a *factor* to be allowed for. Diffraction—that curious property of light whereby the rays passing close to the edge of an opaque body tend to get deflected from their rectilinear course—may also here be referred to as an element to be noted, although in reality its practical effect here is very small.

Width of Aperture

Further, there is the working width of angle to be considered. A very small aperture gives a correspondingly reduced angle of view within which it is effective. Of course, if the diaphragm were practically of no thickness, this consideration might be put aside, as having no significance to speak of. But as our diaphragms, however carefully reduced, have appreciable thickness, and our needle-holes are to that extent imperfect, we must take account of the fact that *reduction of aperture diameter means reduction of working angle.*

Allowing to each of these considerations its proper weight and endeavoring to strike a balance which will suit the necessities of the average worker, we come to the conclusion that an aperture of about $\frac{1}{50}$ of an inch in diameter forms a very convenient *maximum* for ordinary use. At this width of aperture we get a great measure of delicacy in detail along with vigorous definition. A carefully made needle-hole of this size will easily allow of working up to an angle of 140°. It passes a sufficient stream of direct rays to put out of account diffraction and such reflection as may not have been successfully neutralized; and it allows of the plate being considerably set back from the aperture without either destroying "depth of focus" or necessitating a long exposure.

Consider the Needle

A No. 10 needle makes a hole about $\frac{1}{55}$ of an inch in diameter, a No. 11 about $\frac{1}{65}$, and a No. 12 about $\frac{1}{75}$. We recommend these as the three sizes for normal use—a No. 10 for general purposes, such as landscape work, or where the light is poor; No. 11 where a high degree of delicacy in definition is wanted, e. g., in interior or architectural work; No. 12 for work requiring exceptional fineness of detail, such as copying high-class engravings, say for lantern slides, which have to be shown on an enormously magnified scale on the screen. It is possible to work effectively with an aperture as small in diameter as $\frac{1}{100}$ of an inch; but, owing to the extreme attenuation of the stream of rays passing through so tiny an opening, and the consequent necessity of working at a very short plate distance and with a very restricted angle of view, this may be regarded as out of the range for ordinary use. On the other hand, there may no doubt often be occasions when a larger aperture than the normal might be advantageous. In portrait work, for instance, in which soft effects and short exposure are desirable, it may be found that the hole made by a No. 8 needle (i. e., about $\frac{1}{45}$ of an inch in diameter) is small enough; still this size had better be regarded as only for exceptional use.

Focus?

So much for apertures. A more ticklish question now awaits us, namely, that of focus. It will no doubt have been gathered from what we have already said that under the heading "Focus" the present writer feels disposed simply to say, "There is no such thing in needle-hole photography." He may here make the confession that from reading a casual magazine article which started him off on the study of needle-hole work, he began with the supposition that there must be focus just the same as in lens work. His experiments, however, soon presented him with reasons for coming to a different conclusion, and he is now possessed with something more positive than doubt. It may be that, speaking theoretically and from the point of view of mathematical exactness, the picture obtained through a needle-hole is not strictly identical in value at different distances from the aperture; but, in so far as that is true, the variations from absolute sharpness are due to other factors that than which we technically know as *focus*.

This opinion receives a significant, if indirect, corroboration from the extraordinary divergence in the conclusions come to by those who have accepted the common view.

In this matter of calculating the so-called "proper focus" for each aperture, the disagreement is simply hopeless. For illustration, let us compare the results on one single point. Not to occupy space with the formulæ upon which the several workers rely, we give, as nearly as we can figure them out, the conclusions arrived at, respectively, by Mons. Colson, Mr. T. R. Dallmeyer, Mons. Combe and Sir W. Abney, as to the "focus" for three different apertures, viz.: $\frac{12}{1000}$, $\frac{16}{1000}$, and $\frac{20}{1000}$ of an inch in diameter. These differ just a little from the respective apertures of a No. 12, a No. 11 and a No. 10 needle; but for convenience let us call them A, B and C.

Aperture	Colson	Dallmeyer	Combe	Abney
A	Under 4½ in.	Over 2 in.	Over 5 in.	2¼ in.
B	Over 7½ in.	Over 4½ in.	Over 7 in.	4 in.
C	Over 12 in.	Over 5½ in.	Over 9 in.	6¼ in.

When experts disagree so enormously, do we need any further justification for concluding that in lensless photography real focus does not exist? The more we look into this question the more we are disposed to say that the practical worker will do best not to trouble himself with formulæ as to the relation between the aperture and the plate distance, but proceed as his own judgment and experience direct.

On the face of the matter the conditions peculiar to photography with a needle-hole would seem *a priori* to make real focus impossible. True focus can only be realized where rays tending to disperse are intercepted by some medium, such as the curved glass of a lens, which bends them equally until they concentrate at one point in a given plane (the sensitive plate) upon which it is desired that the rays from all other parts of the view should likewise be gathered. You cannot have focus without the intervening medium to produce it, and in the lensless camera there is no such medium. Here the rays from any one point pass *straight and unchanged* through the aperture to the plate, because they are conveyed by the one medium from their starting point to their destination. True, as we have seen, we have the elements of reflection and diffraction to reckon with; but these have nothing to do with focus as such, and in any case we do what we can to neutralize them. The inference thus suggested by the theory of light action is completely corroborated by experience in actual work with the lensless camera. We have obtained results in which the eye can detect no difference in quality, at every point in the range between 3½ and 8 inches—indeed our illustrations present almost as wide a variation of plate distance, and our readers can judge for themselves as to the point in question.

Are there, then, no rules or principles at all to control plate distance? Is our exposing at one distance or another to be a matter of haphazard? By no means. Although focus has nothing to do in determining the matter, there is a right and a wrong distance in every case, and there is a reason—sometimes several reasons—for choosing one rather than another.

How *near* to the aperture can we bring our plate? Well, this is first of all a question of the angular limitation of the particular needle-hole we propose to use. A No. 12 needle hole if well made should cover an angle of 95° or 100°, which means a plate distance of 3 inches for a half plate, less of course for a quarter plate. A No. 10 needle hole should work up to an angle of 130° or 140°, which means that it would cover a half plate at less than 1½ inches. As a matter of fact, one would never want to work so near to the aperture, except for very special purposes; but it is well to know that, so long as we keep within the field which the angular limitation allows, and *only want a very small picture*, we *can* work as near to the aperture as we please without any loss of definition, and even with a gain in the matter of "focal depth."

A second element, however, comes in to mark more decidedly the degree of approximation to the aperture, and that is the relative effect of light upon different parts of the exposed plate, as regards its power of impression. The illuminating and impressive power of light diminishes rapidly according to the length of the line it has to travel. It will at once be seen how this operates in the case of a flat sensitive plate exposed in a camera. The point of shortest distance between the luminous aperture and the plate will be the center. The axial rays that fall there, therefore, will obviously be greatest in effectiveness, and the further the rays spread out on either side of the center the less effective they will necessarily be when they reach the plate. The larger the angle included in the picture, the more apparent becomes the falling off at the sides of it.

Influence of View Angle

The bearing of this upon the matter in hand will be made very apparent by an appeal to the eye. In each of the following diagrams let N be the needle-hole, PP the plate, and II the circle of equal illumination; but let Fig. 10 represent a plate distance twice as great as Fig. 9. In each diagram IP represents the increase in the length of ray at the margin as compared with the center. It will at once be seen that this increase is much greater in Fig. 9 than in Fig. 10; which means that the *falling off* of illumination (which, be it remembered, is as the square of the linear distance) is very much greater with the short plate distance than with the longer one. Therefore, the more we shorten our plate distance the greater risk do we run of having our picture showing less vigor at the ends than in the center, owing to more rapid development where the light has fallen axially than where it has fallen obliquely.

Now it is true that the diminution of effect from the center outwards is going on to some extent in all cases; but the effect is not at once noticed by the naked eye. Where the plate distance is moderately long (say 4 or 4½ inches, using a half-plate; 3 or 3½ inches using a quarter [3¼ x 4¼] plate) the difference at the margin does not show sufficiently to be detected. But if we shorten beyond this moderate limit, the difference very soon becomes apparent. Let Fig. 10 be taken as indicating the shortest plate-distance at which the diminution of illumination at the margin is not observable by the naked eye. IP (in Fig. 10) will then represent the extreme lengthening of the ray that is permissible. If we measure off the same distance on Fig. 9 (which shows a plate distance only half as great as in Fig. 10) it will come in at *ip*. At this shorter plate distance, then, *pp* will stand for the part of the plate in which the picture is effective. The part *pp* at either end would be so inferior in vigor that it would be better away. The conclusion then is, that if we *must* shorten our plate distance below the normal *minimum* we must also be content with a smaller plate.

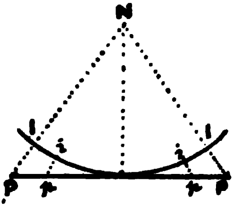


FIG. 9.

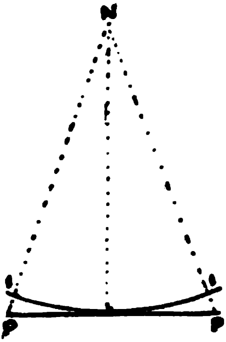


FIG. 10.

The Normal Minimum What the "normal *minimum*" is can easily be ascertained by a little experiment. So far as my experience goes, it seems to be about 4½ inches for a plate 4¾ x 6½, and 3½ inches for a plate 3¼ x 4¼.

Plate Distance and Exposure So much for the considerations that limit the forward movement of the plate. The question of how far we may "recede" our plate from the aperture is almost entirely one of the time we can afford to give for exposure. As we take our plate backwards the definition continues quite as sharp as ever—indeed it becomes if anything sharper, since the margin of diffusion counts for less — but as the "carrying power" of the light fails a rapidly lengthening exposure is demanded, until it becomes inconvenient or even impracticable. No great drawback in this respect, however, is likely to be felt within the eight inches provided for in our camera.

This brings us to what is after all the prime essential in determining plate distance. We have seen that we have in our camera a range of choice, varying from three to eight inches. At all points in that range we may count upon results of practically equal quality. What, then, leads us to fix upon one distance rather than another? Simply the consideration of how much we want to include in our view. The right plate distance is just the distance which gives the proper amount of picture for the size of the plate, or the suitable magnification for the object we are photographing. Whatever subject we are dealing with, we would in ordinary circumstances want to take in just about the amount we could comfortably and clearly see with the unassisted eye. That would correspond to an angle not exceeding, at the outside, 60° or 65°. On that principle, then, we conclude that the most convenient working distance would be, for a quarter plate, three to four inches; for a 5 x 4, four to five inches; for a half plate, five to six inches — and so on according to the size preferred.

The Problem of Exposures

Now, under the general heading of *Principles*, it remains that we should take up the problem of exposures.

It goes without saying that in lensless work the exposures must in the nature of things be comparatively long: at least we call them long in these days of lenses made to work at lightning speed. But a little examination of facts shows that the light through a needle-hole works by no means so slowly as most people suppose.*

It is generally taken for granted that the effect of rays passing through a needle-hole bears a strict proportion, area for area, to the rays passing through the aperture in the diaphragm of a lens. If this were true, it would be easy from the many excellent tables prepared for lenses to calculate what should be allowed for needle-hole exposures. But a very little experience suffices to prove that inferences based on this are quite unreliable. For one thing the light passing through the medium of a lens is more or less altered as to its quality, and cannot be safely compared with the light passing straight through a needle-hole without any change of medium by the way. We have seen it stated that "eight times more photographic energy passes through a 'pin hole' than through a lens having a stop of the same diameter." We think this an exaggeration; but there can be no doubt that very many lenses debase or weaken the actinic quality of the light which passes through them. The slightest discoloration of the glass or of the cementing medium between them will make an enormous difference.

---

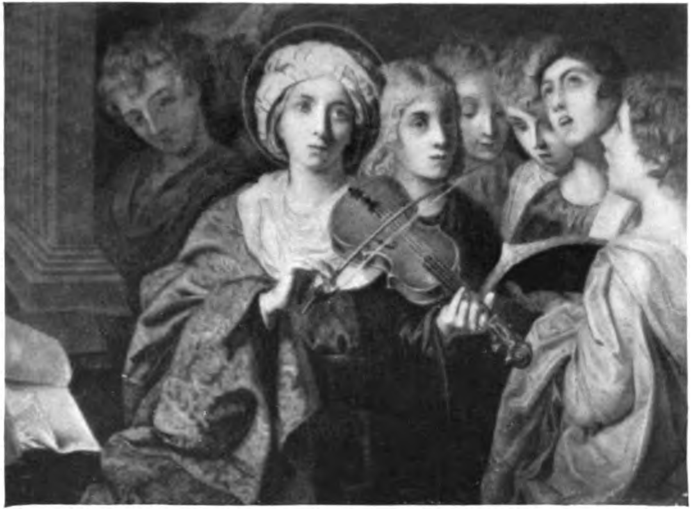
*The common notion that one cannot easily overexpose through the needle-hole is an egregious mistake.

Then there is always this great difficulty in the way of working out a comparison that each lens operates in the main only at one focus, whereas the needle-hole camera is untrammeled by focus and operates at widely different distances from the plate.

An Attempt at System

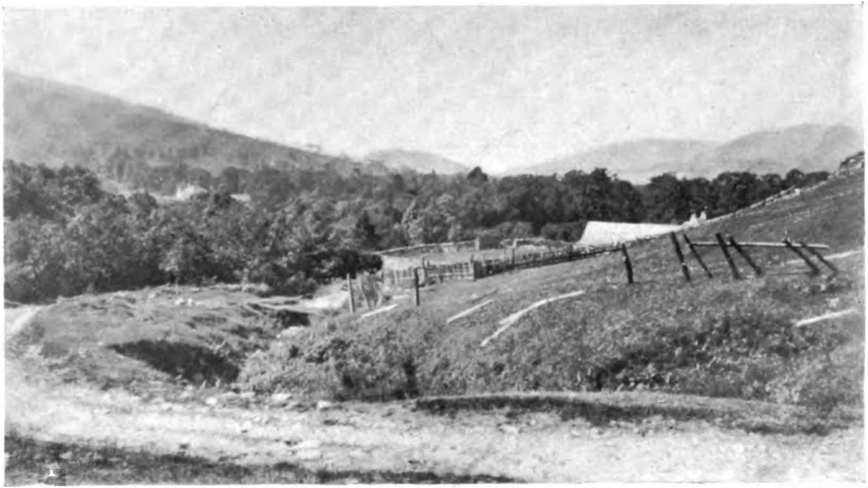
In these circumstances, there is nothing for it but independent experiment. It is as the result of such experiment that the writer ventures in a tentative way to submit the following arrangement—with humble apologies beforehand to all who shall find that the light conditions in their part of the world require the figures in any way to be modified. He can only say that, so far as he is concerned, living under the too often gray skies of Scotland, he has found the tables to give just about the effect desired. Whatever alteration, if any, may be required will probably be in the direction of slightly reducing the exposures indicated. Of course, in lensless as in all other photography, much must be left for decision to the experience and good judgment of the individual worker.

Two tables are given—the one for *Time of Year and Day*, by way of determining the column under which the exposure is to be sought; and the other for *Exposures*, showing in the several columns the time to be allowed for different kinds of subjects. Then follow



S. S.

ST. CECILIA (by Domenichino)
Copied by reduction, with a No. 12 needle-hole
J. B. Thomson



3¼ x 6

INVERGLEN LOCK FYNE, SCOTLAND
Made with a No. 10 needle-hole
J. B. Thomson

some directions as to *allowances* that may have to be made—these to be by no means overlooked.

Table for Time

HOUR A. M. P. M.	June	May July	April Aug.	March Sept.	Feb. Oct.	Jan. Nov.	Dec.
11 to 1	A	A	A	B	D	F	G
10 or 2	A	A	B	C	F	G	H
9 or 3	A	A	C	D	G	J	K
8 or 4	B	B	D	F	I		
7 or 5	D	E	F	H			
6 or 6	E	F	H				
5 or 7	G	H					

NOTE.—Find proper letter in above table, and read in corresponding column below.

Exposure Table (in seconds)

SUBJECT	A	B	C	D	E	F	G	H	I	J	K
1. Distant view: No near foreground: Beach and river scenes well lighted..............	3	4	5	6	8	10	12	16	24	30	60
2. Near view with long distance: Light objects near: Field and road well lighted.	6	8	10	12	16	20	24	30	48	60	120
3. Near view with foliage or shadows in foreground: Street scene and portraits out of doors.	12	16	20	24	32	40	48	60	90	120	240
4. Interior well lighted with clear glass windows: Glades under trees...........	2m	3m	4m	5m	6m	8m	10m	14m	18m	24m	48m

The above gives the *Unit of Exposure* for the following conditions:

1. *Most rapid plates.*
2. *Perfect sunshine:*
3. *No. 10 needle hole:*
4. *Four inches of plate distance.*

Allow for other conditions as follows:

1. **PLATES.** If *medium rapid* used—*a half more* exposure.
If *ordinary*—*double* exposure.

2. LIGHT. If *sun slightly veiled* but sky clear — *a half more.*
If *sky clouded*, but atmosphere clear — *double.*
If *sky gloomy — four to eight times as much.*
3. APERTURE. If *No. 11 Needle-hole — a half more.*
If *No. 12 — double.*
If *No. 8 — Reduce by a half.*
4. PLATE DISTANCE. For *every inch beyond four — a half more.*
For *every inch less* than four — *reduce by half.*

NOTE.— *The increases under these various heads are cumulative.*

Examples

We hope the arrangement is self-explanatory, but if there is any difficulty a couple of illustrations of its working will make matters plain.

Let us take an afternoon in June with average light conditions, and a morning in early autumn with plates of medium and extra rapidity.

First illustration:—*Time*, June, 2 o'clock P. M.; *view*, panoramic with light objects near; *plates*, medium rapid; *light*, sky clouded, but clear atmosphere; *aperture*, No. 11 needle-hole; *plate distance*, four inches. The solution would work out as follows:

Time table shows Column A.
Exposure table gives under A, 6 seconds as unit.
Allowance for medium rapid plates, a half more, i. e., $6 + 3 = 9$ seconds.
Allowance for light, double, i. e., $9 \times 2 = 18$ seconds.
Allowance for aperture, a half more, i. e., $18 + 9 = 27$ seconds.
Allowance for plate distance, nothing needed.
The proper exposure, therefore, is 27 seconds.

Second illustration:—*Time*, August, 10 A. M; *subject*, portrait out-of-doors; *plates*, most rapid; *light*, sun slightly veiled; *aperture*, No. 8 needle-hole; *plate distance*, five inches. Solution:

Time table shows Column B.
Exposure table gives under B, 16 seconds as unit.
Allowance for plates, none.
Allowance for light, a half more, i. e., $16 + 8 = 24$ seconds.
Allowance for aperture, reduce by half, i. e., $24 - 12 = 12$ seconds.
Allowance for plate distance, a half more, i. e., $12 + 6 = 18$ seconds.
Proper exposure, 18 seconds.

Practical Applications

Having constructed our apparatus and mastered the principles involved in lensless photography, we are now ready for practical work, and ready in a much wider sense than we can be with any ordinary camera. Here, indeed, our difficulty is to know where to begin, for we have quite an *embarras de richesses* as regards the fields opened up to us. Our little box, fitted up as we have indicated, can do anything photographic (always excepting snap-shot work), and do it with distinction. Furnished with this unpretending instrument, we are equally at home in depicting landscapes, street views, architectural and monumental subjects, statuary and flowers; even portraiture is not out of our way. Copying, including enlargement and reduction, can be accomplished with the greatest ease and beauty, while our *repertoire* includes the two most interesting and useful fields of stereoscopic and panoramic photography. Our illustrations, it will be noticed, cover many of these varied fields; and, we may say, for the encouragement of fellow-amateurs, that they were all obtained with an humble apparatus which cost the writer a few pence.

It is manifestly out of the question for us to enter into those various departments in the way of elaborate discussion. An adequate treatment of photography in so many different styles would require more than a MINIATURE to itself. All that we can do here is to give, in a brief practical way, a few necessary hints in each department from the point of view of the "needle-hole" worker.

Landscapes

Landscape will probably be among the first things to occupy our attention—as, indeed, by its endless and ever-varying charms, it will prove to be a perennial source of delight; and here, by the way, we may remark, that while photography in all its branches is of great educational value, we think that it is preëminently so in those branches that bring us face to face with nature and call us to give thoughtful heed to its manifold aspects. It is a hundred times worth all the expenditure involved to have our aesthetic sense quickened and satisfied, and to be, by the necessity of careful observation, made alive to the large thoughts that pervade nature, and to learn to see so much more of the interesting, wonderful, tender and delicate than other people do, through getting into the habit of looking for effects, and of studying groupings, lines and tones in the scenes that meet our eye.

And in the study of nature our needle-hole camera, homely though it be, will not disappoint us. For, by its aid, we can register the thing that delights us just as we see it. In perspective, in faithful interpretation of gradation in distance, in "atmosphere," in tone, in all the elements, in fact, which go to make *naturalness*, the result given leaves little to be desired. As the special quality in the needle-hole photograph of scenery is inherent in the action of the lensless camera itself, and requires no particular manipulation to produce it, we need not here dwell upon what is necessary to the obtaining of the most successful picture. The rules that apply to ordinary photography are just the rules to be attended to here. It is all a question of good judgment and artistic feeling, in learning to know what constitutes a picture, how the lines should run, how the masses and tones should be made to balance, and how the light should fall.

An Example

The mechanical part of our task runs thus. Suppose we are taking a half-plate photo; we slip our plate into the slots at a plate distance of about 5 inches for usual. The distance would be shorter if we want to include more; longer if we desire more magnification of the object. If we wish only a limited amount of foreground, our exposure will be made through the upper shutter, which will give us the same effect as a rising front. If we want an upright picture, or desire to take in a high object near at hand, we would tilt the camera on to its side so as to set the plate vertically, and expose through the stereo shutter, having first closed the lower hole by inserting a small piece of cardboard or paper.

Sunlight

In landscape work with the lensless camera we need not be afraid of sunshine. Hardness of tone is rarely produced through the needle-hole in any circumstances. A flood of light that would give an ordinary photograph an unpleasant stiffness only adds brilliancy to a needle-hole photograph, without in the slightest degree impairing its tone. Indeed, so long as we avoid that glare of reflection which obliterates detail in our subject, the more light we have the better.

Wind

The chief source of trouble in the outdoor use of our camera is wind, which agitates the trees and vibrates the camera. It is desirable therefore, whenever possible, to choose a still day for all views in which detail of movable objects is desired. When this is out of our power, we should at least try to get some solid thing on which to set the camera, as the somewhat lengthened exposure would otherwise give vibration a hurtful opportunity to lessen our success.

Successive Exposures

In the photographing of nature-subjects, one often wishes to take several views in succession. Very specially when one is out for a holiday is the need of a changing arrangement felt. Almost any one of the usual devices can be adapted to the lensless camera if desired. But the necessity for any such hampering complication is obviated by using the following plan. Into our box let us insert two movable partitions, as figured on p. 114, so as to make the posterior part into two compartments. Let us store our sensitive plates or flat films in the middle compartment (D E), emulsion side to the front. When one photo is taken, we open the box in a changing bag, put the exposed plate or film into the back compartment, and take a fresh plate from the middle compartment. So on to the end of our stock, which may comprise a dozen plates, or, if we please, a hundred films. The manipulation is simplicity itself; it can be done very quickly, and with the most moderate attention there is no possibility of mistake.

Architectural and Street Photography

Architectural and street photography presents another wide field in which we may occupy ourselves to admirable purpose. In this department, indeed, the lensless camera is of preëminent usefulness, revealing, as it does, excellences all its own. Very specially is the rectigraphic quality of the needle-hole seen to advantage and tested as to its value in the rendering of architectural subjects. Straight lines, in whatever direction they run, or however long they may be, are reproduced with mathematical accuracy. If the camera is properly set, distortion is impossible. Here, too, we have absolute exactitude in perspective. With a wide-angled lens, such as a photographer must ordinarily use in architectural work, exaggeration in perspective (which is just a kind of distortion) is inevitable. That will not trouble us. Be our field of view ever so wide, the lines will fall in just as they ought. The largeness of the angle, too, at which our camera will work enables us either to operate very near to our subject, which is often extremely desirable, or to photograph lofty erections without the necessity of standing a considerable way off. These various qualities make it quite easy for us to deal with interiors, which are the despair of many a photographer; while out of doors we are quite at home for effective work in cramped and confined places, where the lens is simply useless. In the photographing of street subjects the same qualities prove themselves invaluable. And when to these we add the softness and delicate harmony of tone which give the true artistic stamp, we see that in this whole class of work the lensless camera is in a sphere which perfectly suits it.

It is in architectural and street work that the adaptability of plate distance, which is one of the special features of needle-hole photography, is seen at its highest value. Here there is no need to take in from a given point more than we want, with the consequent waste in trimming. All that is necessary is to determine the angle of view which we wish to include, and set our plate back or forward accordingly. Sometimes there occurs a desirable subject for a picture which we cannot approach closely, or which can only be seen from a distance, which in ordinary photography would reduce it to a mere "midget" size. But with the needle-hole camera we are not nonplussed by any such circumstance. Simply let us set our plate back, and we have all the magnification we want, with the same beauty of detail as if we had been able to approach quite near.

We hardly require to point out, with reference to the depicting of architecture, the importance of setting the camera *quite level*, both as from front to back and from side to side. Great care must be taken on this point.

Towers, Spires, etc.

In photographing very high objects, such as towers, spires, monuments, etc., which we want to be sure of having complete, it is well to have some definite rule by which to go. Here is one which I have found to be as satisfactory as it is easy of application, and which will often save time, temper and plates. In setting it down we take it for granted that we are photographing on the same level as the base of the high object. If we have to stand some feet lower, we must add that amount to the height of the object for our calculation. The rule is one of simple proportion. To find how far we must have our camera standing back from the object in question so as to have it of a proper magnification on our plate, we state the sum thus: *As is the height of the needle-hole above base of front (inside) to the plate distance, so is the height of the object to the proper camera distance.* This would allow nothing for "headroom" in the picture; so we need to increase the ascertained camera distance by a small amount proportionate to the clear top-space which we wish in the picture. For example, suppose the object to be depicted is a spire 150 feet high, and that we are working at a plate distance of 5 inches and photographing through an aperture 4½ inches above the base (inside)—the sum works out as follows—4½ : 5 : : 150 : camera distance, i.e., 166½ feet. Add a few feet to this for clear head-space, and we find that 60 yards is about the right distance back.

The *converse* of this rule applies very usefully in other circumstances. Sometimes the local conditions will allow us to go back only a certain distance, and we must either take the picture from that point or go without it. At other times we cannot get nearer than a certain distance. The problem in either of these cases is, what must be the proper plate distance? The statement of our sum, then, would be this: *As is the height of the object to the height of the needle-hole from the base (inside), so is the distance of the object to the proper plate distance.* Here again we need to make an allowance, in proportion to the clear head-space wanted in the picture, i.e., we must make the plate distance a fraction *less* than our calculation shows, so as to widen the angle.

Composition

It is not within our province to discuss the principles of composition in this class of work. That has been already efficiently done by the writer of *Street Photography*, The Photo-Miniature, No. 14, and we cannot do better than refer to his remarks on *Concentration of Interest* as a guiding law. His notes about choice of time of day with a view to good lighting, and about the principles of exposure in street work, are also worthy of very careful attention in taking up this work.

Statuary, Flowers, etc.

It is one of the strong points of lensless photography that it renders with a notable realism all objects to which one wishes to give the appearance of standing out solid, such as statuary, groups of sculpture, monuments, etc. The photographs taken by means of the needle-hole are characterized by a remarkable "depth of focus." This plastic quality is seen in all kinds of needle-hole pictures, but it is especially observable in the case of such objects as we have just mentioned. So pronounced is this peculiarity, particularly where a short plate distance is used, that one has almost the feeling of seeing round the thing represented. The value of this is obvious, and when considered along with the great width of angle and adaptability for magnification, it shows the lensless camera to be just about the best instrument possible for this whole class of work.

The same quality points to the suitability of our camera for the purpose of flower photography; and here, as a matter of fact, we find it equal to the most delicate demands. As a practical point it may be noted that in dealing with statuary or flowers a small aperture is to be preferred. A No. 11 or No. 12 needle hole is not too small for such photography.

Portraits

In portraiture with the lensless camera the "depth of focus" gives also interesting results. Of course, the somewhat prolonged exposure limits the use of the needle hole in this department; but where it can be conveniently applied, the realism of the picture and the solidity combined with softness are often both useful and beautiful. The need of shortening exposure as much as possible points to the use of a somewhat large aperture. A No. 8 needle-hole would bring the exposure within quite reasonable limits.

Copying

The reproduction of engravings and the like by copying is another department in which the lensless camera gives a very good account of itself—so much so that not infrequently the copy is even more charming than the original. Not only are the lines and the general tones of the engraving reproduced with fidelity, but the hatching is so softened and blended that a new aspect is given to the picture. Indeed, so far can the blending be carried by the choice of a suitable aperture, that a line engraving can be made almost to assume the appearance of a half-tone engraving.

The rectigraphic quality of the work done by the needle-hole makes such a camera as ours capable of rendering important services to artists, designers, architects and others, who desire to have their drawings copied in one scale or another with mathematical accuracy; and one can conceive of quite a number of industrial purposes for which such a means of easy and exact reproduction would prove a great boon.

The method of procedure in copying is very simple. To prepare the camera we take out both the partitions figured in our diagram (p. 114), and set our plate into the very farthest back slots, i. e., so as to give a plate distance of 8 inches. I recommend this distance for two reasons. It enables us to work farther back from the engraving we are copying, so as not to interfere with the light upon it; and it makes the calculation of the proper copying distance a somewhat simpler matter. Any other plate distance, however, will give equally good results, so long as care is taken to avoid shadowing the picture. Any method of fixing the engraving may be adopted that will enable the front of the camera to stand exactly parallel to it. For an engraving of moderate size, as good a way as any is to lay it flat on the floor, or on a table, close to a well-lighted window, and by some simple arrangement photograph downwards, taking care, of course, that the camera is set quite perpendicularly.

The principle of determining the copying distance is extremely easy of application. If we want to copy equal size, the plate distance and the copying distance must be equal, i.e., the needle-hole must be eight inches from the engraving. If we desire to reduce the diameter of the picture to a half, then the plate distance would be half of the copying distance, i.e., the needle-hole would be sixteen inches from the engraving; and so on over the whole range of proportions.

Except where for some special reason a particularly soft effect is wanted, it is best to copy with one of the smallest apertures. Book pictures copied through a No. 11 or No. 12 needle-hole make beautiful lantern slides. Here is a means of illustrating lectures, etc., with the minimum of trouble.

Stereoscopic Work

The preparation of stereoscopic photographs is a branch that has been somewhat neglected. It is rather difficult to account for the fact, considering the unique and often surprisingly attractive effects which are obtainable, unless it be due to the expense involved. No doubt, in the case of those whose means are limited, this is a sufficient explanation, seeing that an additional and considerably more costly outfit has hitherto been considered essential. That difficulty need no longer stand in the way. The lensless camera brings stereoscopy within the reach of the million; and we cannot but feel sure that, if it were only generally understood how felicitously the needle-hole supplies all the essential conditions involved, there would very speedily be a stereoscopic revival. No separate outfit is required, as all that is necessary, in order to get an absolutely equal pair of pictures, is to make two apertures with the same needle.

Here is how the work is done. We set into the front part of our camera the accessory shown as Fig. 7 on p. 114, a very simple appliance made of cardboard or thin wood, which divides the front part of the camera into two equal compartments. The length of the partition is determined by the plate distance desired, and the exposure is made by that movement of the shutter which opens the two stereo apertures simultaneously, thus giving for each of the two parts of the plate an equal impression.

As the distance between the eyes is under 3 inches, the prints are best mounted with the corresponding objects in the two pictures about that distance apart. Hence it is necessary, in order to get a desirable amount of view, that the plate distance should be short and the angle wide. From 3½ to 4 inches is the length of partition recommended. It is essential to success in stereo work that the camera should be perfectly level and the front perpendicular. It should be noted also that the prints need to be transposed in mounting.

Panoramas

The last, but by no means the least, important application of the lensless camera to which we shall refer is for the representation of panoramic views. There has recently been a considerable quickening of interest in this form of photography, and that is not a matter for surprise. For one thing, the panoramic shape of picture is a relief from the hitherto popular proportions, these being often "dumpy," to the extent of looking inartistic. Those who have noted the much greater length in proportion to the breadth which, for instance, water-color artists are wont to use, must have been struck with the very pleasing effects realized by the elongated shape of picture—especially when the artist wants to convey the impression of a soft atmospheric tone over a wide expanse of sea or land. The panoramic form of photogram is obviously the one most suitable for views which extend laterally, and which can only be properly understood when represented comprehensively. It is peculiarly applicable to such subjects as sea and river scenes, views in flat countries, and such features in town scenery as broad open squares—wherever, in fact, the central horizon line is the prominent line of the picture.

Now a great many devices have been tried for rendering this kind of photograph, most of them costly, and either exceedingly difficult to work with (as in the case of the rotating camera), unsatisfactory in result (as in the case of the water lens, or a lens of very wide angle), or else limited by certain conditions not always capable of being met (as in the case of the clever and often useful "Panoram Kodak," which can only be worked efficiently in what we may call a "snapshot light"). The needle-hole camera has none of these drawbacks, and it gives the widest panoramic pictures on precisely the same conditions, and with the same simplicity and certainty, as ordinary photographs. One great advantage that it has over any revolving device is that it allows of a time exposure, so making one sure of one's effects, and not in the same way dependent upon the condition of the light.

The accessory represented as Fig. 8, on page 115, shows the necessary appliance. It is set into the camera with a film in the curving face of it, and the photograph taken in the usual way. Of course, a panoramic picture may be taken on a flat plate. This is, indeed, necessary where there are straight horizontal lines in the immediate foreground. But the flat plate has drawbacks for this class of work. As we have to operate with a very short plate distance — 3½ or 4 inches — the great difference between the length of the axial rays and the rays that pass very obliquely to the edges leads to both unequal lighting and unequal magnification of objects as between the middle and ends of the picture. Besides, the angle of view is much less than on the curve.

The curve is made with a radius equal to the plate distance. Hence the rays at all points in any given line of the curve are of equal length, and there are both equal lighting and strictly proportionate magnification from end to end of the film, even when we work up to an angle of 120° or 130°. Of course, with one curve we must always work at one plate distance—but as that distance will be in every case comparatively short, this is not felt to be a drawback. It may also be remarked that the curve is not suitable for use where there are horizontal lines nearer than twenty yards or so. For an obvious reason it bends such lines. Beyond that distance, however, no effect of this kind is noticeable.

In taking a panoramic photograph with our camera, the points to be kept in view are such as these. We photograph as nearly as possible on the plane of the central or horizon line. We must see to it that the camera is very carefully leveled. We choose if possible a position where the foreground is not too pronounced, as the middle and far distance are the important things, giving the characteristic impression of expanse. If the foreground be chosen with notable objects in it, these must be, if possible, vertical, and we must let them come to the side of the picture, so as to form a sort of frame or setting for the middle view, and to give a sense of distance by comparison. If we attend to these things the lensless panoram camera will not fail to satisfy us with results.

A New Name

In ending this brief account of lensless photography I would like to urge the adoption of a new name, it being clear that "pinhole" photography is not only erroneous but misleading. A name should express the thing it represents, and be descriptive as well as self-interpretive, so that whoso meets with it shall at once grasp the characteristic of the thing named. Lensless photography has the fault of being a negative definition. To my mind Rectigraphic is perhaps the most suitable term for the purpose. *Rectus*, from which we get the first part of the word, means *direct* or *right*, i. e., correct.

Now, directness and correctness are precisely the two distinctive features of lensless photography. In taking a photograph thus the rays pass straight (direct) from the object to the sensitive plate, and as there is nothing to distort them in their passage from the one point to the other, they register an absolutely right (correct) representation of what the camera has in its field of view. If it be objected, from an etymological point of view, that the term presents a mixture of two languages—Latin and Greek—our reply is that, if the second part of the word belongs to the Greek tongue by birth, it belongs to the Latin by adoption; so that there is no incongruity in wedding the two parts together and dealing with them as one. *Rectigraphic*, then, with the word *lensless* as supplementary or alternative, seems best to supply the missing self-explanatory term properly descriptive of this branch of photography.

Our Illustrations A word of explanation is required with reference to the illustrations here presented. I am not acquainted with any photographer, professional or amateur, that has given serious attention to needle-hole work, and whose stores can be laid under contribution for the illustration of these pages. I am constrained, therefore, to send a few of the results of my own experiments in the independent working out of the subject here dealt with. They are offered not with any claim to artistic merit, but simply as average specimens of the kind of result which the needle-hole will produce in the various departments which we have just described. It should be mentioned, however, that they were produced under great disadvantages in the absence of facilities for photographic manipulation.

BOOKS

The literature of the subject here dealt with is scanty in the extreme, and that which does exist will give little practical help to the average photographer. We may refer to a couple of articles by Sir William Abney which appeared in *Photography*, December 26, 1895, and July 4, 1896, and the substance of which has been incorporated in the last edition of his "Instruction in Photography." In the same journal, July, 1895, appeared also a paper read before the Photographic Society of Japan, by Mr. Isawa. *The Photogram* is publishing a series of valuable papers on the subject which should be seen. March–June, 1901.

The only manual in English known to the present writer is *Stenopaic*, or *Pin-Hole Photography*, by F. W. Mills and A. C. Ponton, which gives a *résumé* of the aforementioned articles and of the algebraic calculations of their writers.

Two elementary French manuals may be named:

La Photographie sans Objectif au moyen d'une petite ouverture, par R. Colson (Gauthier-Villars et Fils, Paris).

Sans Objectif. Lettres a ma fille sur la Photographie au moyen d'un trou d'aiguille, par J. Combe (P. Guilleminot, Roux et Cie, Paris).

ANTI-TRUST

PURE
COLLODION
PAPERS

MONARCH MATTE

MONARCH
TRADE MARK

MONARCH GLACE

RELIABLE
UNIFORM
PERMANENT

Three times quicker printing than any other

Prices same as other Collodion Papers

MANUFACTURED ONLY BY THE

MONARCH PAPER COMPANY

E. & H. T. ANTHONY & CO.
SOLE TRADE AGENTS
122-124 Fifth Avenue : NEW YORK

ANTI-TRUST

Kindly mention THE PHOTO-MINIATURE

NOTES

THE PHOTO-MINIATURE for July will be devoted to seashore photography, and will contain about all the special information available concerning the use of the camera in this particular field. As those who have photographed along the coast know, photography at the seashore has its peculiar difficulties as well as its undeniable attractions. The conditions of atmosphere and light are, of course, very different from those ordinarily encountered in town and country, and the variety of subjects available at the shore during the summer months form a class by themselves. The monograph will be carefully prepared to meet the desires of both average workers and serious students. We hope to have the number ready on or about July 15.

❧

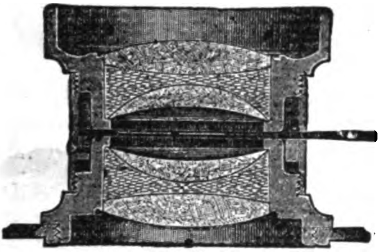
THE PHOTO-MINIATURE needs practical information about night photography—photographing outdoors after dark, street views, fountains, special bits, park views or snow scenes at twilight or by moonlight—in other words, all the things a man with a camera can handle out-of-doors after dark. There is a big field of work in this, of absorbing interest, and doubtless many of our readers have done more or less work in this direction.

The information desired must be first-hand experience, not gathered from data already published; must give full details concerning manipulation; and should preferably be supported by an example of actual work. If those who can supply such information will address the editor hereof he will be obliged for the favor.

If money be any inducement, we gladly set apart twenty-five dollars for the best account of the sort received before the end of August. Not less than 3,000

THE BEST UNIVERSAL LENS IS

THE GOERZ



DOUBLE
ANASTIGMAT

Equally useful for indoor and outdoor work, having great covering power, superb definition, and the highest practical speed for instantaneous photography. Used by expert amateur and professional photographers in all branches of the art.

Every Goerz Double Anastigmat can be used in three ways:

As a lens of universal purpose (instantaneous views, portraits, groups, landscapes, architecture, etc.).

The back lens only for taking objects at a long distance double the size the whole lens would give.

As a high-class, quick-working wide angle for a size the diagonal of which is double as long as the focus of the lens.

Catalogue on Application

C. P. GOERZ
52 Union Square, New York

words, nor more than 5,000 words are desired. Mss. not found available will be returned as speedily as possible if postage is enclosed.

◆

The Postal Photographic Club, in which Mr. Osborne I. Yellott is a leading conspirator, seems to have more life in it than many similar associations. A few days ago Mr. Richard Hines, Jr., another member of the P. P. C., at Mobile, Ala., gave the orphan children of his town a lantern show with the exchange slides. He writes: "Every member of the exchange would have felt repaid a hundredfold for his labor in making his slides could he have seen the joy of the children at the show." There were about two hundred children present from the four orphanages of the town, and it was a happy hour for Mr. Hines and his co-laborer Mr. Wilson—to whom be honor for the good deed.

◆

A display of gum prints by Mr. F. A. Waugh formed the May exhibition at the rooms of the Photographic Society of Philadelphia.

Writing of another matter some days ago Mr. Waugh tells us: "My continued experience in gum printing leads me to draw the following conclusions, not fully reached in The Photo-Miniature No. 22:

1. Clean, fresh mucilage is the best of gums. It is more reliable than the best gum arabic, and a whole lot easier to handle.

2. Ammon. bichromate is better than potass. bichromate, and should be given the preference. It works faster, softer and more smoothly. The increased cost is utterly insignificant.

3. Lalanne and Julio papers are the best of all for most purposes. They are especially easy to coat, and ought therefore to be chosen by beginners as soon as the first experimental stage is passed. Smooth papers like Rives and Steinbach glossy are practically useless. Even such a matt surface as that offered by Steinbach rough is hard to use and gives much less coherent

CRAMER'S
Isochromatic
Plates

ARE THE MOST PERFECT COLOR-SENSITIVE PLATES ON THE MARKET

◆

Made in Three Grades of Speed:

SLOW, MEDIUM and
INSTANTANEOUS

◆

For Sale by all Dealers in Photographic Supplies

◆

Manufactured by

G. Cramer Dry Plate Co.

ST. LOUIS, MO.

OFFICES IN

NEW YORK, No. 32 East 10th Street
CHICAGO, Room 705, Cable Building
SAN FRANCISCO, Room 38, No. 819 Market Street

Use Mallinckrodt's Sodium Sulphite Anhydrous
Absolutely Pure for Photographic Purposes

results (I guess that's what I mean) than Julio or Lalanne.

◆

For the benefit of English readers of American photographic papers, we hasten to explain that the letters C P after ingredients mentioned in American formulæ signify nothing more or less than "chemically pure," and have nothing to do with the "Columbian Pharmacopœia"—if such a work exists. C P preparations are more expensive than the ordinary commercial varieties, and their use is usually indicated only where purity of ingredients is essential to success in the use of a formula.

◆

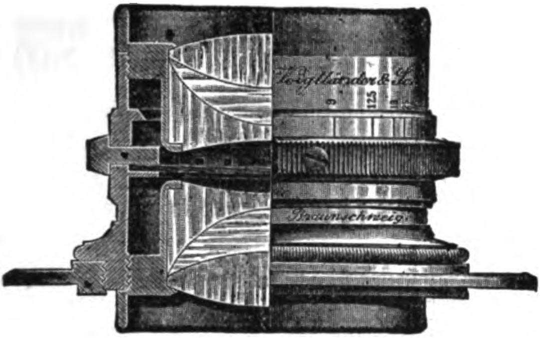
A new semi-monthly photographic journal is announced with the title *The Photographic Chronicle*. It is to be edited by John A. Randall, a well-known photographic journalist, and will be published from 56 Chancery Lane, London, beginning June 15. The subscription price is $1.50 per year.

◆

Mr. Ralph W. Robinson, Redhill, Surrey, England, has issued an illustrated catalogue of "Pictorial Photographs" by his father, the late H. P. Robinson. The booklet opens with a biographical note written by Mr. George Davison, and, apart from its value as the only available list of Robinson's works, contains some interesting items concerning the original negatives and life of Mr. Robinson.

◆

Mr. W. I. Scandlin, of *Anthony's Bulletin*, 124 Fifth Avenue, New York, is arranging a party to attend the National Photographers' Convention at Detroit, August 6 to 9. The party will travel by the Erie R. R., and the round trip fare, including a double berth and seat to Detroit, is fixed at $22.15. Meals may be had on the train *a la carte*. On the return trip to New York those so desiring may journey from Detroit to Buffalo by lake steamer, where a stop-over of ten days may be se-



The Fastest Anastigmat

If you are doing high-speed work or working under poor light, you require the HIGHEST OBTAINABLE SPEED

You Do Not Want F 7.7

You Can Do Better Than F 6.8

You Can Get F 5.6

IT'S OFFERED IN THE

Collinear Lens

**Sold by all Dealers at
Uniform Prices**

**THE VOIGTLAENDER & SON
OPTICAL COMPANY
137c West 23d Street, New York**

Kindly mention THE PHOTO-MINIATURE

cured. This will permit an extended visit to the Pan-American Exposition and Niagara Falls. The party offers anyone visiting the convention from New York a convenient and comfortable journey in the best of company, and will doubtless be popularly supported.

❧

There are many signs that the National Convention will be an affair of unusual interest this year, and we would urge the professional readers of The Photo-Miniature to make such preparations as are needed to take a few days' holiday and attend the meeting. Full particulars may be had from the vice-president, Mr. D. D. Spellman, Detroit.

❧

The Bausch & Lomb Optical Company, Rochester, N. Y., announce a cash prize contest open to users of their *Plastigmat*. The first prize is $100, and the second $50, for the best and second best pictures made with the Plastigmat, and submitted before July 20. No restriction is imposed as to the size or subjects of the competing prints, which will be judged on the basis of artistic composition and lens quality. The prints must be submitted in sealed envelopes bearing an assumed name. The contest closes July 20, and the prizes will be paid July 30.

❧

Henry Kahn & Co., opticians, of New York and San Francisco, have opened a new store at 89 Broadway, New York, and equipped it with a complete stock of photographic and optical supplies.

❧

In a recent lecture before the Camera Club, Mr. Arthur Burchett, from whom we have heard too little of late, says of composition in pictorial photography:

It is not only desirable to give the idea of form but also in many cases to express the idea of wind, sunshine or other effects. This can best be done by making the contrasts strong, in fact by exaggerating rather than by

Where Weight is Considered

USE SEED'S NEGATIVE FILMS

PERFECTLY FLAT
CANNOT CURL
ACCURATELY CUT
CAN BE USED IN ANY PLATE CAMERA

We supply our 26X, Gilt Edge and Orthochromatic emulsions coated on celluloid and cut to any size desired. Our films are identical in quality with our plates of the same brands. They are much in demand by tourists because of their lightness and convenience. Manipulated and developed same as dry plates.

If weight is a consideration, get our Negative Films for your plate camera. Order through your dealer.

We have just published a new

MANUAL

Send for a copy. Free on request

M. A. SEED
DRY PLATE
COMPANY

ARROW BRAND.

M. A. SEED DRY PLATE CO.

St. Louis, Mo., 2005 Lucas Place
New York, N. Y., 57 East 9th St.

Kindly mention THE PHOTO-MINIATURE

being quite true to nature. In pictorial photography, as in drawing, it is not essential that there shall be actual detail in all objects, a shade without actual form is often far better than truth. Even an out-of-focus-all-over effect often gives more truth than one that is sharp, owing to the fact that light and shade in this case alone appeals to one. With a very sharp picture one thinks more of detail than is desirable. Somber subjects require, to give them their proper expression, to be in a low key, but beware of overdoing it.

In the composition of the picture it is advisable to keep the greatest light or greatest dark more or less in the center of the picture, so that the eye shall not be kept too much at the side of the picture. In the treatment of light and shade much depends upon the balance of parts. They should not be of equal value, but one should predominate.

Finally, beware of over-fastidiousness. Even if the light and shade be not quite all that you wish—still Nature is always beautiful, though she may not seem to be beautiful to you at that exact moment—yet to others she may be far finer than the effect you wish to obtain.

◆

Messrs. Burke & James, 132 W. Jackson Boulevard, Chicago, have undertaken the trade agency for The Photo-Miniature in their city, and all wholesale orders for the magazine *from dealers in Chicago* should hereafter be addressed to them. This will ensure a quicker service than we can offer from New York, and the convenience is one which will doubtless be appreciated by those handling the magazine in Chicago.

◆

The last number received of the *Journal of the Photographic Society of Philadelphia* contains the following report on "The Toning of Bromide Prints with Ferricyanide of Copper," by William S. Vaux, Jr.:

While the toning of bromide prints with ferricyanide of copper has been practiced for some years, its use has not become common, and probably few are aware

ROSS

NEW EXTRA RAPID SERIES F 5.6
UNIVERSAL

Symmetric Anastigmats

"The most generally useful Lens for the Professional or Amateur Photographer."

THESE New Lenses are aplanatic, working with the Standard aperture F 5.6, superseding the formerly popular Universal Symmetricals in consequence of their freedom from distortion and better covering properties.

No.	Equiv. Focus	PLATE COVERED with Large Stop	PLATE COVERED with Med'm Stop	PLATE COVERED with Small Stop	Prices in London
	Inches				*Dollars*
1	5	3¼ x 2½	3¼ x 3¼	4¼ x 3¼	26
2	5½	3¼ x 3¼	4¼ x 3¼	5 x 4	28
3	6	4¼ x 3¼	5 x 4	6½ x 4¾	29
4	7½	5 x 4	6½ x 4¾	7½ x 5	37
5	9	6½ x 4¾	7½ x 5	8½ x 6½	45
6	11	7½ x 5	8½ x 6½	9 x 7	60
7	13	8½ x 6½	9 x 7	10 x 8	77
8	15	10 x 8	12 x 10	13 x 11	102
9	18	12 x 10	13 x 11	15 x 12	135
10	21	13 x 11	15 x 12	18 x 16	180
11	24	15 x 12	18 x 16	22 x 18	232

Five per cent. discount for cash.

The cost of pairing two lenses for stereoscopic work is $2.

The Circle of Illumination
includes an angle exceeding 70°

ROSS LTD.

Manufacturing Opticians

111 New Bond Street London, W., Eng.

SOLD BY LEADING DEALERS EVERYWHERE

of this easy means of obtaining a variety of very pleasing tones. The results are similar to those obtained by the use of salts of uranium.

The print to be toned should be developed, fixed and washed in the usual way, but care should be taken that the final washing is thorough. On placing the print in the toning solution a gradual change in color takes place, first to black, then warm brown, purple, and finally deep red. During these changes a slight diminution in density takes place, but unless the final red tones are desired it does not appear necessary to make the original prints of special density. When the proper tone has been obtained the print is well washed and dried.

While several formulæ have been published, the following gave very satisfactory results when diluted with from three to ten parts of water:

Citrate of potassium . .	250 parts 10% solution
Sulphate of copper . .	35 " " "
Ferricyanide of potassium	30 " " "

Add solutions in the order given and use promptly.

The set of prints made from the same negative and originally the same color show the range of tones. It will be noted that the blacks and browns closely resemble platinum prints.

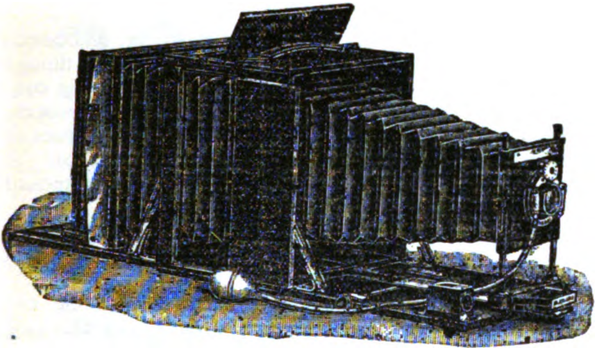
◆

At the stated meeting of the above society, April 10, an interesting discussion ensued upon the keeping quality of orthochromatic plates. We quote part of this as touching a subject of universal interest.

The subject was introduced by Mr. Walter P. Stokes, who had found that orthochromatic plates must be developed immediately after exposure, otherwise they soon spoiled.

William H. Rau gave his experience in Paris and in Switzerland last year with the plates in question. He had procured a supply of plates in this country and, upon testing them, found they were perfect. These plates were exposed abroad, and the few test plates developed on the ground were correctly timed and quite

High-Grade Apparatus



The Long Focus Reversible Back

MONTAUK CAMERA

FEATURES:

Convertible Lens, Unicum or "Auto" Shutter, Rising and Shifting Front, Reversible Back, Rack and Pinion, Double Extension Bellows.

PRICES:

Folding—		Cycle	
4x5,	$40	5x7,	$40
5x7,	50	6x8½,	50
6½x8½,	60		
8x10,	70		

GRAY DAY SERIES

Fitted with

ROSS GOERZ LENSES

F 6.8 to 7.7

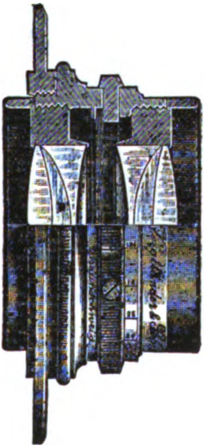
For Views, Portraits, Copying

OR

Collinear Lenses

SERIES II. F 5.6 to 6.3

The Fastest Lens Made



Send for Lens Catalogue *Send for Camera Catalogue*

G. GENNERT, 24-26 E. 13th St., New York

Kindly mention THE PHOTO-MINIATURE

satisfactory. After he came home, however, and began development he found that the plates acted as though much overexposed — the action of the light having continued. By using a formula for developing process plates, diluting it very much, and using liberal doses of bromide of potassium, he had saved the negatives. A few of the plates which he brought home unexposed were tested and found to be all right.

Dr. W. D. Robinson suggested that the continuing action of light might be due to absorption by the stain used in the plates.

Mr. Pancoast gave his experience with some cut films sent to him from abroad to develop. In this case light action had continued until the high lights were visible before development. By prolonged development in a strong solution of pyro (40 grains to the ounce), a large proportion of bromide and no alkali whatever except the sulphite, he had saved the films. They were of a yellow-brown color, but of good printing quality.

George D. Firmin said he had used, at the seashore, some orthochromatic plates of medium rapidity, and, although he kept the exposed plates six weeks before development, had gotten good results.

George Vaux, Jr., said he had had a similar experience to that of Mr. Rau with color-corrected plates. He had found great difficulty in judging the development of such plates, even when kept only four or five days; but it often happened that a plate which appeared to be hopelessly overexposed cleared in the fixing bath and proved to be perfectly good.

William N. Jennings said he had had some trouble lately with double-coated plates — negatives made with them showed halation. The makers had asked for the return of the plates, saying that the two coatings had become combined in some way.

❧

Some time ago we gave a method for focusing dark interiors (quoted from a foreign contemporary) which caused a critic to smile. His theory was that a match or lighted candle supplied all the requirements of the darkest interior he had photographed. Personally, we agree

THERE ARE NOW IN USE OVER

234,000
LENSES

manufactured by
the Bausch & Lomb Optical Co.

This enormous number represents only Bausch & Lomb-Zeiss Anastigmat, Rapid Universal, Alvan G. Clark, Rapid Rectilinear, Portrait, and Wide Angle Lenses, and does not include the millions of simpler photographic lenses produced.

THE POPULAR VERDICT, as expressed by actual purchase and use, is that our lenses are practically WITHOUT A RIVAL.

OUR PRODUCTS ARE OBTAINABLE FROM ALL DEALERS

CATALOGUE FREE

Bausch & Lomb Optical Co.
ROCHESTER, N. Y.

NEW YORK CITY
Broadway and 28th St.

CHICAGO
State and Washington Sts.

Kindly mention THE PHOTO-MINIATURE

with the critic, but there must be something in the case which is not plain to the critic and ourselves, for the foreign journals persist in publishing new methods for the same purpose almost as frequently as they publish the time-honored formula for "blackening lens diaphragms," etc. Here is the latest, from *Photography:*

Those who devote much time to photographing the interiors of cathedrals and other dark buildings know how difficult it is to equalize the definition of near and distant objects. The general arrangement may be made with full aperture, but the question then arises, what stop shall be used to obtain fair definition over the whole of the parts in view? Upon which of the receding objects should the lens be focused so that both the near and the distant objects shall be reasonably sharp? If an object half-way be chosen, we know that as the aperture is diminished the distant objects will become more sharply defined than those near to the lens, and with the diminishing aperture the more difficult it is to estimate the degree of definition obtained. The plan of holding a lighted candle or match in proximity to, alternately, a near and a distant portion of the building is very well in its way, but cannot always be adopted and is sometimes misleading when it can. A better plan is the following: After the general scheme has been arranged, and while the largest available aperture is in use, measure backward from the nearest plane one-third of the distance toward the most distant plane, and focus sharply upon a central object in the plane so determined. There should be no great difficulty in focusing even in a comparatively dark interior, if *f*/8 is used. The aperture may then be diminished until either the question of exposure forbids the use of a smaller stop or the foreground objects are critically sharp. In either case the foreground and distance will be equally defined. Although the rule, like many other useful optical rules, is not theoretically correct, the deviation from theoretical exactitude is so slight as to be quite negligible, and entails no elaborate calculation in its application. A foot rule is all that is necessary, and even that may be dispensed with at a pinch, and some more crude form of measurement adopted.

Trade Mark

Actien-Gesellschaft für Anilin-Fabrikation, Berlin S. O.
Photographic Department

Manufacturers of the patent Developers:

Eikonogen

Eikonogen produces a negative of ***ample density, full of detail*** and ***gradation***, but with a ***peculiarly artistic*** and ***soft effect***, thereby avoiding a harsh picture, even when development is forced.

Eikonogen produces the most pleasing results from snap-shots or flash-light negatives.

Diogen

Diogen is a handy, efficient and elastic developer, which has found much favor in America owing to its adaptability.

Prices of {EIKONOGEN / DIOGEN}

1 oz.	4 oz.	8 oz.	16 oz.
$ 0.37	1.20	2.10	3.95

EIKONOGEN, ready for use
in Cartridges or Glass-Tubes

Per box of ten, giving each 140 cc. Solution $ —.95

Pamphlets on Developers free on application through all dealers or importers

Sold by all dealers

★ RODINAL ★

★ AMIDOL ★

★ IMOGEN ★

The May issue of *Everybody's Magazine* contains a delightfully illustrated review of the work of Gertrude Käsebier by Charles H. Caffin. Miss Frances B. Johnston's second paper on the "Foremost Women Photographers of America," in the June issue of the *Ladies' Home Journal*, deals with the work of Miss Mathilde Weil, of Philadelphia.

◆

The correctness of the Ortol formula given on page 557 of The Photo-Miniature No. 11: *Developers and Development* has been questioned more than once. To settle the matter, we give the formula as received from its source, the Cramer Dry Plate Works, St. Louis:

Ortol Developer

A	Water (iced or distilled) . . .	1,000	parts.
	Metabisulphite of potassium .	7½	"
	Ortol	15	"
B	Water	1,000	"
	Carbonate of soda	120	"
	Sulphite of soda	180	"
	Bromide of potassium	1 to 2 parts.	

For quick development, use equal parts of A and B. For slow and soft, one part A, one part B, and one part water.

◆

At a recent meeting of the Royal Photographic Society Mr. Charles L. A. Brasseur, of New York, described the Sampolo-Brasseur process of indirect color photography. As this method has not yet been published in America we make room for it here, although somewhat lengthy for our pages. It must be five or six years since Mr. Brasseur showed us "laboratory experiments" of the sort mentioned in his report before the R. P. S., and we have frequently wondered as to the final outcome of the process.

Mr. Brasseur said that this process involved the making of one negative and from that three printings. The results shown on this occasion, the lecturer said, were only laboratory experiments. He believed he

$610 Cash Competition

WITH GRAND PRIZE OF $200 IN CASH

for Prints on

"ROTOGRAPH"

Bromide Paper

Send 2-cent stamp for particulars of Competition, or

Better still

Send 10 cents for sample package of "Rotograph" Paper, circular of Competition and copy of our new magazine

"The Bromide Monthly"

"ROTOGRAPH"

B. RUSSEGER
E. S. MAPES } *Selling Agents*

101 Fifth Ave., New York

Kindly mention THE PHOTO-MINIATURE

could justly term the process the complement of all the indirect processes of color-photography—those of Maxwell, Cros, Du Háuron, Ives, Joly, and McDonough. A single negative of the subject is required. It is made through a ruled polychrome screen, such as is described by Du Háuron and Joly, the specimens shown and used in this process having 531 lines per inch. Seen on the sheet by means of the lantern, the lines were only barely visible even at close inspection. The negative obtained, in black and white, the relative values of the colors of the object. From this negative the three intercalated negatives can be extracted, and from them prints on paper can be obtained by photo-engraving, photo-lithography, and other methods of reproduction. Positives from the negatives are apparently no different from ordinary positives, but if they be examined under a microscope it will be found that they consist of three interwoven images. Slides were projected making this fact quite clear. While one of the photographs was on the screen, Mr. Brasseur passed in front of it in the lantern an analyzer ruled in black so as to cut out two lines in every three. By shifting this screen over the negative three separate times, the width of one line, the audience were enabled to see that in the one negative are three negatives,—the differences of opacity corresponding with the color values of the subject. The advantages claimed for the process are (1) that the negatives furnish prints in black and white that are very much superior to those from ordinary negatives, as the color values are more exactly rendered. The lines, too, are so fine that they are practically invisible. (2) That the negatives serve as a permanent record of colors, and either prints on glass or paper can be made commercially. (3) That positives from the three interwoven negatives can be used for projection by means of the triple lantern, or positives can be made on glass by means of three superimposed films. (4) Positives on glass when viewed through a screen ruled in primary colors, will show the colors of the original (see Du Háuron and Joly). In the space at our disposal it is only possible barely to outline the process. The means adopted for the production of

Thousands of photographers
are using

LOVELL
COLOR DIFFERENTIATING
PLATES

with better results and greater satisfaction than they had from any other orthochromatic plates

FOR ALL PHOTOGRAPHIC WORK
WHERE COLOR IS CONCERNED
OUTDOORS OR INDOORS, IN
PORTRAITURE, COPYING,
LANDSCAPES AND INTERIORS

Positively the best orthochromatic plates in the market. Sensitive to the entire spectrum; giving brilliant negatives; simple in manipulation.
A trial will convince.

May be had "backed" on request in two speeds
C. D. "FAST" and C. D. "MEDIUM"

OBTAINABLE FROM DEALERS OR DIRECT FROM FACTORY
SEND FOR PRICE-LIST AND SPECIAL CIRCULAR

LOVELL DRY PLATE MFG. CO.
NEW ROCHELLE, N. Y.

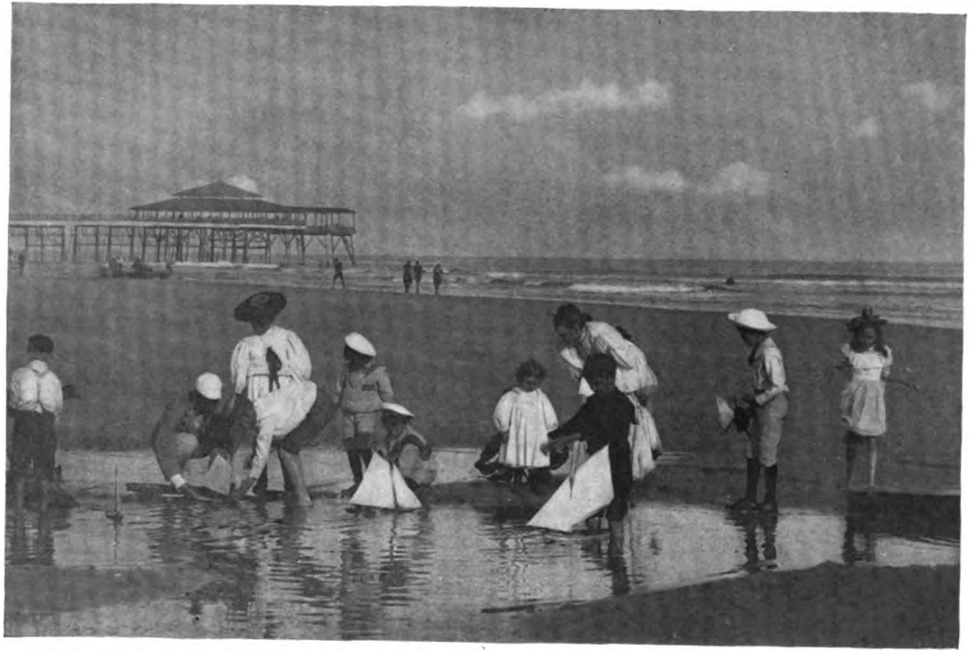
Denver: Hart Bros. & Wells.
Western Depot: 64 Wabash Avenue, Chicago.

Kindly mention The Photo-Miniature

colored images by subtraction of light have considerable interest. It is absolutely necessary that the pigments must be superposed, not juxtaposed as are the colors in the screens. To do this the positive is placed in close contact with black and white analyzing screen or stencil. As before described, the effect of this is to block out everything but the lines, forming one color impression. A negative is made from this, and while it is being exposed the negative plate is shifted twice each time the space of the width of one line, a suitable exposure being made between each move. The result of this is to convert a partial image occupying but one-third of the surface of the plate into one occupying the entire surface. Thus separate or independent printing surfaces, one from and for each partial image, are obtained, and from these half-tone blocks may be made and results secured in which the original lines of the color-screen are removed. The exposures for landscapes under average conditions will vary from one-fifteenth to one second, for marine views one-sixtieth second, and studio exposures fifteen to thirty seconds. Mr. Brasseur showed several photographs by his process, including two of the American flags, which were considered very good performances.

◆

Photography for the Press (Photography for Profit Series, No. 1) is a new book just issued by Dawbarn & Ward, Ltd., London, which should fill the proverbial "long-felt want." In this handy volume of 39 pages the editorial staff of *The Photogram* have gathered much useful information concerning the choice of subjects, photographing, and preparing for the use of editors and publishers, of such photographs as are likely to be needed in newspaper and magazine illustration. Several specimen press pictures are given and a good deal of technical information pertaining to the special branch of work dealt with. Price, 50 cents.



SEASHORE PUDDLERS
George D. Firmin

The Photo-Miniature

A Magazine of Photographic Information

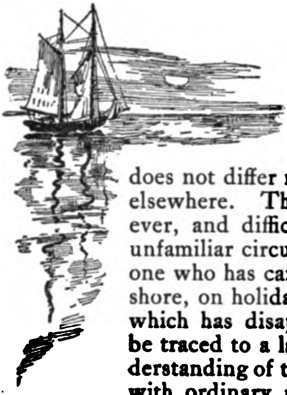
EDITED BY JOHN A. TENNANT

Volume III JULY, 1901 Number 28

SEASHORE PHOTOGRAPHY

In an early number of THE PHOTO-MINIATURE dealing with photography outdoors, a few general hints were given concerning marine photography. Since that time many correspondents have urged the need of a little book wholly devoted to this field, and more especially treating of photography at the seashore. In the following pages I have gathered all the information available on the subject. It has not been an easy task. The few scattered papers on seashore work published here and there are extremely meager in practical details and strangely contradictory in their counsel. In these circumstances I had recourse to one long skilled in photographic work along the coast, and what follows embodies the practical experience of Mr. George D. Firmin, whose pictures so attractively illustrate the text. Mr. Firmin's help is here most cordially acknowledged.

Of the delights of life at the seashore it is unnecessary to speak. To spend a few weeks in every year within sight and sound of the sea is to garland the years with the happiest memories. The sea itself is incomparable in the beauty and interest of its ever-changing moods and aspects. The wonderful combinations of sky and water and coast-line which meet the eye at every turn suggest a thousand pictorial possibilities. The life of the coast and its incidents, the varied beauty of form and light and shade which it presents and its fascinating transformation scenes, new every hour, offer a most desirable field for the camera. It is a field as yet comparatively untilled,



wherein the landscape-satiated amateur may find new and delightful themes for his fancy.

Speaking in a general way, photography at the seashore does not differ materially from outdoor work elsewhere. That there are differences, however, and difficulties arising from local or unfamiliar circumstances, is known to everyone who has carried his camera down to the shore, on holiday bent. The lack of success, which has disappointed many, may usually be traced to a lack of familiarity with or understanding of the local conditions interfering with ordinary manipulations. Atmospheric conditions, for instance, demand precautions unknown further inland. The intense illumination or light glare peculiar to the seashore and the strangeness of the subjects found there are real difficulties until known and mastered. At the same time these local conditions make many things possible on the shore which are impracticable elsewhere. The purpose of this monograph is to point out the difficulties and suggest the possibilities of the field, so that the photographer may get more pleasure and more satisfaction from his work with the camera along the seashore.

Cameras

The question of apparatus for seashore work may be discussed with profit, but presents no difficulty as far as actual work is concerned. Most of us have to do what we can with the tools we have, and half the fun in photography comes from adapting what we already possess to the needs of the hour. Some of the most satisfying yacht pictures I have seen were made with a "fixed focus" box of simple construction. The best studies of the sea within my knowledge were made with an old-style field-camera on a heavy tripod, and the ten-dollar hand-camera has done much very clever work. If the man behind the gun knows how and why, the camera becomes of little importance. Wherefore, let the gentle reader content himself with the camera he has and, if he should possess both hand- and stand-cameras, let him take them both into the field with joy according to his intention for the day.

The ideal camera for seashore photography will vary according to the individual fancy and purposes of its owner. No one camera can equally well cover all branches of work. For surf pictures, yachts racing, or views including rapid movement, the "twin-lens" or "reflex" types offer obvious advantages in enabling us to follow or focus the subject with absolute certainty right up to the moment of exposure. A film camera with a modern anastigmat, permitting the exposure of several films without the delay incident to changing glass plates, offers almost equal advantages if we have a really good finder.

For general purposes, ordinary instantaneous work along the shore, etc., the average hand-camera will meet all reasonable requirements. Some things can be had with a camera held in the hand which are not possible with a stand-camera—and contrariwise. Since the long-focus lens is almost indispensable at the seashore, it is plain that the camera must have a liberal bellows extension. A reversible back, double swing, and sliding or rising front are other desirable features. Almost all hand-cameras are fitted with two screw sockets for the tripod screw; a third socket, inserted quite near to the camera front will often be useful to give greater steadiness when we use a long-focus lens on the box and fear vibration. But if the camera lacks most or all of these features the camerist need not despair. A plain magazine "fixed focus" box will give good results if intelligently handled. To know the capacity of the camera and to keep within its limitations is the better part of wisdom.

For serious work or pictorial photography along the coast a field-camera and substantial tripod are essential. Here we need to study composition somewhat, and may give a time exposure. Whatever sort of camera be used, however, it should be as plain and unobtrusive in action and appearance as is possible. All unnecessary trimmings and parts should be dispensed with as fruitful causes of distraction and failure. The simpler the apparatus, the greater will be one's chance of success, especially in working on a more or less crowded beach.

Lenses

The choice of a lens is a very simple matter. An inexpensive view lens will answer for all ordinary purposes along the shore, focal length being the most desirable quality. A rectilinear of the symmetrical type, giving us a single or rapid doublet at will, is equipment enough for almost every requirement. For some surf pictures, yachts at close range, and other high-speed subjects the anastigmat will, of course, be needed. Most of the illustrations in this number were made with a Zeiss Convertible, Series VII.

Focal length is important. The chief defect in many seascapes is the lack of perspective and untruthful drawing resulting from the use of short-focus lenses. Seashore subjects often include distant objects, and these are unduly dwarfed if a lens of short focus is employed. It is often advantageous to be able to work at some distance from one's subject and yet secure a fairly large image. The group which forms the frontispiece was made, unknown to the children, on a 6½ x 8½ plate with a lens of 24 inches focal length. It would have been impossible with a lens of shorter focus. By a long-focus lens is here meant one whose focal length is about twice the base measurement of the plate with which it is used.

Where the shutter will permit, a lens-shade of some sort, such as Nicholson's, should be used to protect the lens from the light glare and obviate reflections. This instrument is perhaps more useful at the seashore than in any other field.

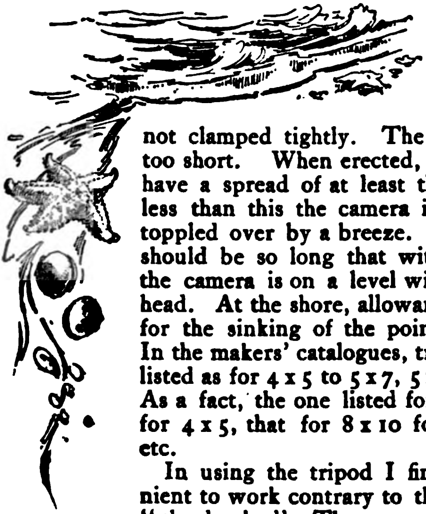
It is important to shield the lens from flying spray and dampness. With a Thornton-Pickard shutter, which consists of a blind working in front of the lens, this is easily managed. With a diaphragm shutter the lens should be protected by a piece of oiled silk large enough to completely cover lens and shutter. This may be readily removed before exposure and should be replaced afterwards. It is well, also, to rub a little oil over the lens and other metal fittings now and again as a preventive of possible rust.

Focusing Cloth

If we use a field-camera, or desire to focus our views before exposure, a focusing cloth will be a necessity. Let it be light and sufficiently ample in size to cover the camera, with one's head and shoulders, completely. Thus the camera and lens can be well protected from the intense glare of light, and we can preserve our good temper. It is always windy at the shore when we attempt to photograph, and a focusing cloth too small to cover things provokes profanity in many ways. The cloth should be well pinned or secured around the lens and be large enough to gather about one's chin when looking at the ground-glass image. It should be waterproof. When the breeze comes from the sea there is always a fine mist or spray in the air which will work havoc with an unprotected bellows and camera frame. Light-weight gossamer cloth is the best for the purpose. The plate-holders should also be wrapped in a few folds of the same material. Moisture is the photographer's greatest enemy on the shore, and sand makes a good second.

Tripod

The tripod usually sold for the light, compact folding camera is too light and flimsy to be of much service for seashore work. Indeed, it is not substantial enough for any kind of work. Portability is desirable, but strength and rigidity should not be sacrificed for appearance or lightness. A tripod with unjointed legs is much more rigid than one which folds. Of course, it is clumsy, and few people will bother with it, but it is best for the picture-taking. Other things must also be considered, notably portability: hence the three- or four-fold tripod leg. If the ordinary sliding and folding tripod must be used, see that there is a good long bearing for the sliding portion and that the folding arms make a sort of mortise and tenon joint with the main part. If these are all tightly clamped the leg itself will be quite stiff. In most tripods of this sort, there is a good deal of play between the legs and the head. This is bad and hard to remedy. A bushing in the hole in the brass lug, on the head (or leg, as the case may be) will be a permanent cure. A temporary expedient is to wedge the pins in



with small splinters of wood. The effect of the loose head is as though the camera was not clamped tightly. The legs are usually too short. When erected, the tripod should have a spread of at least three feet. With less than this the camera is very apt to be toppled over by a breeze. The tripod legs should be so long that with this extension the camera is on a level with the operator's head. At the shore, allowance must be made for the sinking of the points into the sand. In the makers' catalogues, tripods are usually listed as for 4 x 5 to 5 x 7, 5 x 7 to 8 x 10, etc. As a fact, the one listed for 6½ x 8½ is good for 4 x 5, that for 8 x 10 for 5 x 7, 6½ x 8½, etc.

In using the tripod I find it most convenient to work contrary to the instructions in "the books." The camera is fastened with ground glass over the odd leg of the tripod. But the books say the odd leg is in our way here; that we will kick it over, etc. So we will if we are clumsy, but we are saved a lot of bother in leveling and adjusting the horizon height. With the leg in front one has to reach all around the camera to level it.

Tripod Stay

Considerable annoyance sometimes results from the slipping or spreading of the tripod legs when working on rocky ledges, masses of seaweed or other slippery places, especially when the camera is inclined or tilted. Several home-made contrivances suggest themselves as remedies, but best and simplest of all is Mellen's Tripod Stay, an inexpensive instrument helpful in all outdoor work.

Levels

As to levels, the educated eye is best; but a spirit level is sometimes a great help. As good as any is a twenty-five cent article that can be bought at almost any hardware store. This is simply a nickle-plated hexagonal affair containing a glass tube with liquid. It can easily be carried in the vest pocket until wanted. In use it is placed on top of the camera back. A swinging index on the side of the back, such as that made by Thornton-Pickard, is also convenient in leveling "fore and aft."

Working in the Water It is sometimes desired to erect the camera in water, mud, etc., into which the legs will sink to a considerable depth. In this event it is necessary to put some kind of an extension on the tripod legs. A stout stick securely lashed with twine or wire will answer. It must have a long bearing on the tripod leg. If working in water of some depth they must be weighted to keep them down, otherwise they will float up, carrying the camera with them. I made for such a purpose three stout oak extensions, six feet long, with a socket in the top of each, into which the tripod leg would fit snugly for six inches. A piece of metal around this, with a clamping screw like that on regular tripod, completed the outfit.

It is quite annoying after journeying to some selected spot to find that the clamping screw for one (or more) sliding tripod legs has jolted out and disappeared. The only thing to do, of course, is to wedge it out with whatever one can find. It is much better to prevent the loss than to attempt to cure it. This can be done by simply burring the inside end of the screw, which will prevent its unscrewing but will not interfere with its proper working.

Finders A good finder is indispensable. When working on the sea the sort which permits one to see the view from behind will be found most convenient and useful. For surf and shore work the ordinary sort, such as the Iconoscope or Poco finder, will serve our purpose. The varieties of view meters most used in marine work are illustrated in THE PHOTO-MINIATURE No. 4, and need not be repeated here. The simple finder described in our last number will also be found helpful in the absence of a more elaborate instrument.

Ray-Filters or Screens When color-sensitive plates are used a color screen will often help to better results, despite the claim of many manufacturers that their color plates require no screen. The

Bausch & Lomb Optical Company's bichromate ray-filter, the Ideal, or the Carbutt light yellow screens are all good for this work. Focusing should be done with the screen in place, and it should not be forgotten that the color screen increases the exposure from four to six times normal.

Shutters

There is not a great choice in exposure shutters. My personal preference is the focal plane shutter, a roller blind shutter working immediately in front of the plate. Next to this the Thornton-Pickard T. & I. roller blind shutter, working in front of the lens, is most satisfactory. Diaphragm shutters, working between the lenses, are much more compact and neater in appearance, but they are more easily affected by dampness and I have frequently known them to refuse to open or close at the critical moment from this cause.

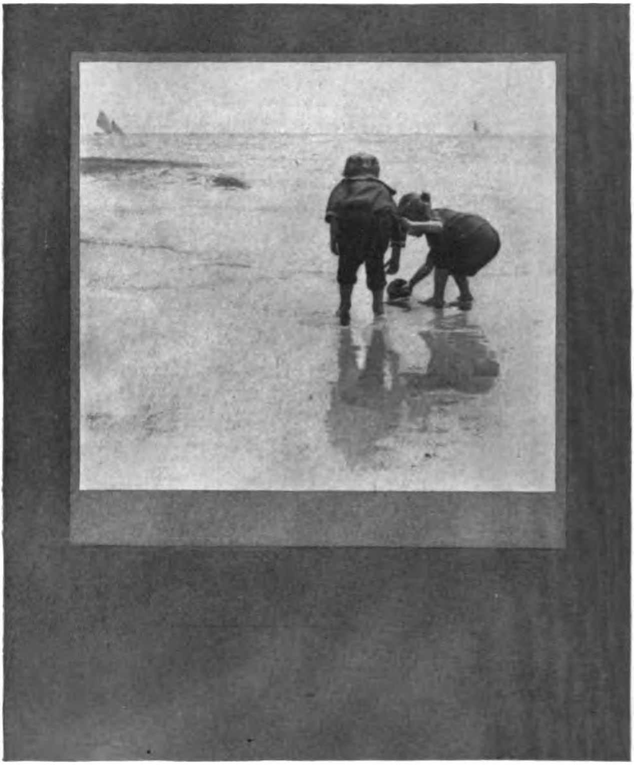
"Stops"

A word about "stops" should have accompanied the note about lenses. Depth of focus and definition are governed by the size of the lens aperture. Those who want everything equally sharp, and wiry definition, can get these qualities by using a small stop. They will lose all atmospheric effect and breadth, qualities which I seek in my work as best expressing the characteristics of the ocean. Hence my practice is to use as large a stop as I dare, gaining thereby distance, atmosphere, softness and pleasing aerial perspective.

Plates: Films

As far as plates or films are concerned the worker may safely follow his fancy. Any reasonably good plate, fast or slow, color-sensitive or otherwise, will give a good negative at the seashore if handled with intelligence. If tone or color values are desirable; if sea and sky are to be represented in harmonious relation, a color-sensitive plate must be used, with a screen. If the color plate is of the slow variety, the ray-filter or screen may be dispensed with. Some workers say that color-sensitive plates should be used under all circumstances where the best results are desired; others show splendid results obtained on plain plates or films, without dye or screen. Personally, I favor the use of color-sensi-

A SUMMER GIRL
George D. Firmin



George D. Firmin

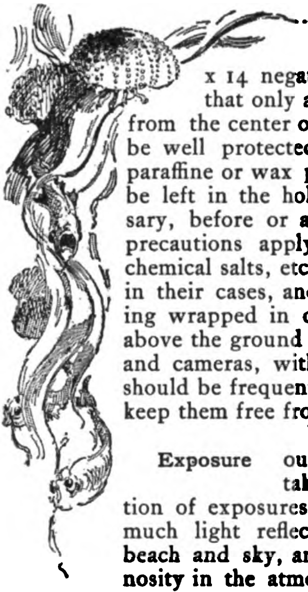
tive plates. The extra rapid plate is clearly a mistake. It is almost impossible to underexpose at the seashore, even on dull days, and the extra rapid plate undeniably fogs and deteriorates more quickly on the coast than the slow or medium speed plate.

There can be no doubt whatever of the advantages of a backed or double-coated non-halation plate for all seashore work as materially offsetting the evil influence of the light glare prevalent everywhere. Taking all things together, experience and common sense seem to indicate the use of a slow or medium color-sensitive plate, backed, and the discriminating use of a screen. The color screen increases the power of the plate to accentuate contrasts, which is often desirable, and clears the detail, thus, to some extent, robbing the view of atmosphere. It is here that discrimination is needed.

Films have several advantages. They obviate the danger of halation, they are light and convenient to handle, and if the cartridge system is used, the change from exposed to unexposed film may be made quickly, which means increased power in making pictures of surf. The use of daylight-changing films also enables one to reload the camera in the field.

Moisture: Sand

The keeping of photographic apparatus and material in good condition is one of the most serious difficulties of work at the seashore. Moisture, dampness, humidity and sand are the photographer's most destructive enemies near the coast. Their evil influence can be overcome only by constant and scrupulous care. Films are peculiarly troublesome, unless kept dry and cool. They should not be left in the camera over night unless the box can be sealed in an air-tight box kept in a cool spot. A tin case, with a big piece of calcium chloride, and which may be sealed with tire tape, meets the difficulty in a practical way. A separate compartment in the box will provide for the storage of spools of film between exposure and development. Color-sensitive and rapid plates need the same watchfulness. Even negatives, developed and fixed, will need looking after, or they will seem to decompose, and mould spots, or a salt crystallization, will appear at the edges, rapidly ex-



tending over the whole film. I have seen an 11 x 14 negative ruined in this way, so that only a small print could be taken from the center of the plate. Plates should be well protected by wrapping in tinfoil, paraffine or wax paper, and they should not be left in the holders longer than is necessary, before or after exposure. The same precautions apply to all printing papers, chemical salts, etc. Cameras should be kept in their cases, and further protected by being wrapped in oilcloth, and stored as high above the ground as is practicable. Holders and cameras, with the lenses and shutter, should be frequently and carefully dusted to keep them free from all pervading sand.

Exposure

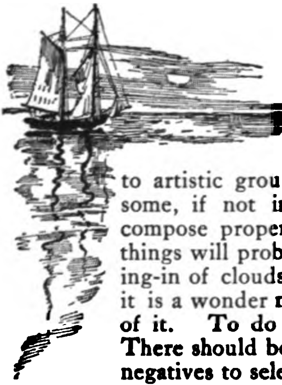
With these preliminaries out of the way, we can now take up the important question of exposures. At the shore there is so much light reflected from the water, the beach and sky, and there is so much luminosity in the atmosphere itself, that it is almost impossible with an ordinary lens and shutter to underexpose. Of course there is a correct time of exposure, as there is everywhere else, but that time will usually be among the small fractions of a second. On a clear day, between the hours of nine and five, it is difficult to make a *cap* exposure without stopping the lens down to such a small opening as to spoil any aerial perspective. With the lens at *f*/8 a speed of $\frac{1}{100}$ second is ample on the beach. I mean actual time, not the speed marked on the shutter, which may be quite different, as will be suggested later. As one leaves the beach and travels inland more nearly inland conditions prevail, but the time should still be less than at home (provided home is very much inland). It is usually necessary to stop the lens to at least *f*/16, which is a drawback if one is using a so-called good lens. The best hours for picture-making are before ten in the morning and after four in the afternoon. Then we may have a little more latitude in exposure. The worker must, of course, exercise his judgment as to how to vary the speed for different illuminations. The exposure must be adjusted not only to the illumination of the objects but also to *the effect which is desired in the finished picture* and to the printing method to be employed. The artist will see these things in his mind's eye before making an exposure. Exposure meters are good things as helps, but I do not think that one should lean too heavily on them. The best is an educated judgment. One should accustom himself to *feeling* the proper exposure rather than calculating. In one case mechanical effect is secured; in the other, the worker puts his own spirit into his work. Some of the "boughten" meters are quite handy little things, notably the Wager meter, and it is somewhat of a temptation to a lazy man to use one.

A few records from the experience of others may be helpful to the beginner. Of several workers giving their methods in the *Camera*, one used Seed 26X and Cramer Banner plates, and with the lens at *f*/32 gave $\frac{1}{25}$ second. This exposure gave detail in the shadows and was sufficient to secure the sense of motion in surf with pleasing definition. Another, working between 10 A.M. and 2 P.M. (against all advice to the contrary), with Seed 27 or Cramer Crown plates, and intense sunlight, gave exposures as follows: with *f*/16, $\frac{1}{100}$ second; with *f*/22, $\frac{1}{50}$ second; with *f*/32, $\frac{1}{25}$ second; and with *f*/45, $\frac{1}{10}$ second. H. A. Beasley, working late in the afternoon, uses *f*/16, and gives $\frac{1}{25}$ second; on hazy days, $\frac{1}{8}$ second with *f*/8. The plate was a Cramer Medium Iso. These records, of course, are simply suggestive, and tell us nothing more than that exposures at the seashore before 10 A. M. and after 3 P. M. will vary between $\frac{1}{8}$ and $\frac{1}{25}$ second, while between these two hours the exposures will run between $\frac{1}{25}$ and $\frac{1}{100}$ second.

Here we may end, for the present, our discussion of technical details and look into the most interesting question of seashore subjects and how to deal with them.

Sea and Sky

A seascape without a cloud in the sky is generally unattractive and unsatisfactory. In fact, in most cases the sky is as important as the foreground. The clouds may



be obtained with the aid of a color screen as mentioned before, or they may be "printed-in" from another negative. The skies in nature are not always arranged with a view to artistic grouping, and it will often be tiresome, if not impossible, to wait until they compose properly: and when they do, other things will probably not be right. The printing-in of clouds is such a simple process that it is a wonder more persons do not make use of it. To do it, "first select your cloud." There should be quite a large number of cloud negatives to select from, so that we can select one suited to the spirit of the scene. It is important to notice that the illumination of the clouds is the same as the rest of the picture; that the negative was made about the same time of day, and, if possible, from the same spot. Whenever clouds are mentioned in the photographic magazines the caution about the proper illumination of the clouds is given. It would seem unnecessary to repeat it, but we see so many otherwise beautiful pictures spoiled by the neglect of this simple rule that it would seem that people either don't know or don't care. Few things are more confusing than to see a landscape lighted from the east while the clouds receive theirs from the west.

In photographing clouds, it is necessary to use some kind of a color screen for those of the light, fleecy variety, cirrus, stratus, etc. They should be focused just as carefully as any other part of the picture. The camera should not be put in an awkward or ungainly position. It should not be pointed toward the zenith, but should be properly leveled, and the swing-back used as for any other object in the ordinary range of vision. There is perspective—distance—in clouds as in everything else. The clouds at the zenith are altogether different in appearance from those near the horizon. If the camera is pointed upwards the clouds will appear as though we were stretched on our backs gazing skyward. The seashore is an excellent place to secure cloud negatives. There are usually few obstructions to the view and it is possible to get a low horizon line. Morning and evening are the best times to secure good cloud effects; but they should be photographed at all hours of the day. It will not do to print sunset clouds in a mid-day scene! Do not neglect the commonplace little cirrus clouds. They are often more valuable than the bizarre, thundrous effects which are apparently more effective as clouds. It is very well to secure photographs of clouds, peculiar and otherwise, simply as clouds; that is of scientific interest, but for pictorial work they should be selected with a view to future use.

Printing-in Clouds

As to printing-in clouds, much has been written about this and several schemes suggested. Being of a somewhat lazy disposition, I could never see the reason for doing a lot of work when an equally good or perhaps better result might be obtained without it. Instead of cutting out a mask to fit all the inequalities of the horizon line, I simply print my land (or sea) scape as though there were no inequalities, or as though I had no thought of printing-in clouds afterward. If the sky portion of this first negative is very thin, I shade it with a gently moving piece of cardboard until the foreground is printed. The sky negative is then placed in a larger printing frame (on a piece of plate glass) and the print arranged on it so that the clouds come in the desired position. The already printed landscape portion is then shaded with a moving piece of cardboard while the sky prints. The sky should not be printed too deeply. The operation is simplicity itself. As to how successful it may be the reader is referred to the group of children entitled "Puddlers;" notice the cloud back of the pier pavilion; also that there is "distance" in these clouds; they are not just *stuck on*. But the whole field of cloud photography is fully treated in THE PHOTO-MINIATURE, No. 24, to which the reader is referred for information filling out my suggestions above.

The Sea

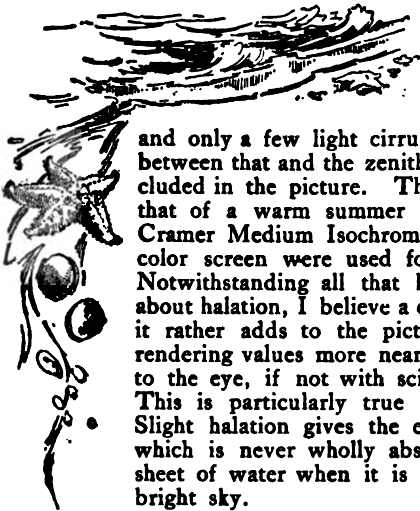
The first and most important object of interest is the sea itself. Ever changing, never still, how may one express its grandeur, its resistlessness? What is there to photograph? Water, waves, breakers. That is all, but how many different moods these may express! Those who have tried to photograph the sea from the shore realize how disappointing is the result. Waves depend upon shadows for their size and shape in the picture. If photographed from above, as from a pier or a boat, they are insignificant, like little ripples in a basin of water. If from a place in the water, near the surface, or below the level of the wave, the effect is quite different. From this vantage point a comparatively small wave may appear mountainous. A line of white foam and spray will give an effect of motion. The stern of a boat is a good place from which to get wave pictures.

Surf

The breaking wave is always beautiful,—sometimes rolling in lazily and remaining seemingly suspended as though reluctant to fall to earth; again rushing angrily in as though to devour the sands which bar its onward course. How shall we express these different moods? We must patiently and carefully watch, study, determine at what instant the wave assumes the shape which most impresses us. That is the time to expose. Not too quickly—a little blur is desirable to convey the effect of motion. For this work a tripod-camera with long-focus lens is desirable. Some curious effects have been obtained by carrying a hand-camera into the water and exposing directly under the breaking wave. The instrument must, of course, be protected from the water. Few of these attempts are successful. They are usually flat, and most sea pictures require sparkle to be effective. The tripod-camera should be set up on the beach as close to the breakers as possible. This last will depend upon the inclination of the beach (as well as of the photographer). The south Jersey beaches are usually flat and the breakers consequently small and distant, so that the camera will often be set up in the water. Sink the legs of the tripod well into the sand. Set the instrument as low as possible so as to give height to the breaker. If the tripod is placed too high it will look down on the wave and make it appear small and flat. Farther north the shores are steeper and the breakers larger and closer. The focusing cloth should cover the whole camera, including the lens, and be removed only at the moment of exposure. Otherwise the spray will coat the glass with a film and the result will be a blur. A breeze blowing off shore, and driving the spray back from the curling wave gives the effect of speed, and a "sparkle" to the whole picture. "Sea and Sky" was made at Cape May just after a northeast storm. An attempt was made to reproduce the impression produced by the clearing away of the "leaden" sky, the still tumultuous sea, with the sun-illumined line of breakers on the shore. In this case the camera was set somewhat high to show the sea beyond the breakers. The tossing fishing boat in the distance, although merely an incident, gives a little more animation to the whole. A lens of 24½ inches focus, and a 6½ x 8½ plate were used for this.

Sunsets by the Sea

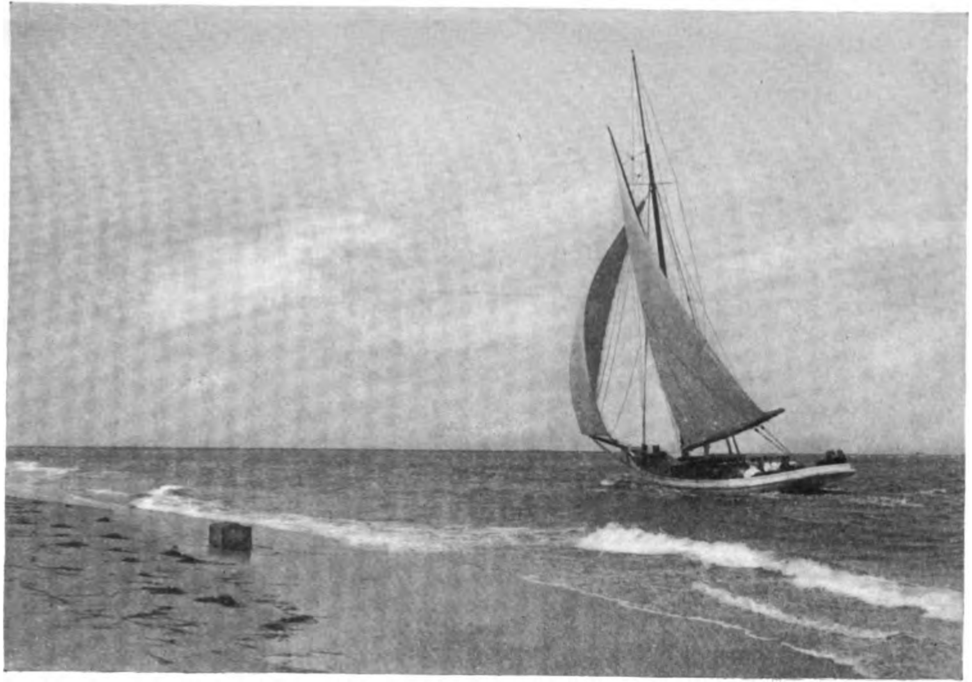
Cloud effects and reflections are responsible for a great deal of the sea's beauty. The sparkle of sunlight from the tips of the waves, lights and shadows caused by passing clouds produce an ever-changing, kaleidoscopic effect. And sunsets! with the ruby-tinted clouds, the sunlight streaming from below the horizon or from behind a cloud, a never-failing delight to photographer and layman alike. How can we make pictures of these? Happy chance? Sometimes, but not always. Watch and wait for effects. "Abide with Me" is the result of six weeks' waiting at Cape May point. Evening after evening I would watch the sunset often, on the ground-glass, and decide it was not just what I wished. Beautiful beyond compare, maybe, in itself, but I knew that when translated into monochrome it would be robbed of most of its glory. And there was possibly nothing else to convey the impressions to the person viewing the print. This suggests that one must learn to forget color, or rather to see the colors as they will appear when photographed, i. e., in black and white. After a stormy day the sunset is usually quite gorgeous. The exposures need not be exceedingly short. The picture just mentioned was made with stop *f*/6 in one-half second. One very curious and at the same time picturesque effect was



obtained after a perfectly clear day. The sun set without a cloud near the horizon and only a few light cirrus about half way between that and the zenith. The sun is included in the picture. The whole effect is that of a warm summer moonlight night. Cramer Medium Isochromatic plates and a color screen were used for these sunsets. Notwithstanding all that has been written about halation, I believe a certain amount of it rather adds to the pictorial quality, by rendering values more nearly as they appear to the eye, if not with scientific exactness. This is particularly true of sea and sky. Slight halation gives the effect of "glare," which is never wholly absent from a large sheet of water when it is illuminated by a bright sky.

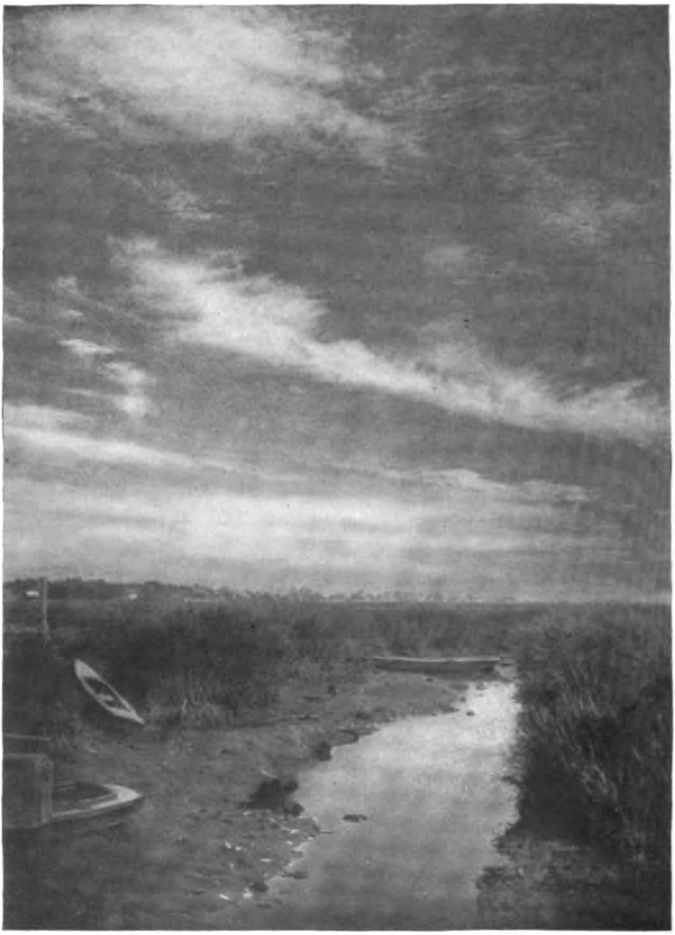
Boats: Shipping

Another source of pleasure to the pictorial worker is the shipping. At most of our summer resorts there is little except the pleasure yachts and small fishing boats. Those who are fortunate enough to summer among the old fishing towns with their quaint harbors have many opportunities to secure pictures of quaint interest and beauty. Concerning yacht photography, but a few words can be said here, although it is worthy of a volume. Some time ago I read a magazine article on the subject, which reminded me of Mrs. Partington's test for washing blue, "If it was good it either sank or swam, she forgot which." This article dealt particularly with the position of the sail in relation to the sun, and boiled down to the statement that the sun must be either back of the sail or in front of it! It is perfectly true! If the light comes from behind the sail the latter appears dark against a light sky. If otherwise, it will probably be white against a somewhat darker sky. The best position for the camera in relation to the boat is a matter of taste. A broadside view or directly bow or



YACHT, OFF ATLANTIC CITY

George D. Firmin



SEA MEADOWS AT LOW TIDE
George D. Firmin

stern "on" is usually not pleasing. About three-quarters is best when the yacht is the picture; when it is simply an incident, that is another matter. Under ordinary circumstances, the white sails photograph so nearly the same color as the sky that special precautions must be observed to secure some contrasts to make the sail visible in the print. The greatest contrast will be secured with the sun in one of the two positions suggested above. The position of the boat on the print is of great importance so far as speed effect is concerned. Unless stationary, it should not be in the center of the picture. If moving slowly, it should have just entered the print and be toiling toward the other side. If sailing rapidly, it should be past the center, approaching the margin. Another thing which affects the speed effect is the rapidity of the exposure. A very quick exposure makes the boat appear lifeless, stationary in one place. A slower exposure may be somewhat "fuzzy," but gives motion, energy, to the object. The spray over the bow does not then appear to be made of marble suspended in the air; it is water, living, moving water.

High Horizon Line

A great deal can sometimes be made of a sailing boat at anchor, especially if some sails are set. The picture is made as much by the shadows as by the object, so they must be carefully looked after. For this sort of thing we require an exceedingly high horizon line. The object then occupies a small space near the top and rippling zigzag shadows all the rest. Do not be afraid of too much foreground, or rather, forewater. More pictures have been spoiled by lack of it than because of too much. I know that to some people this may be heresy, but it is my belief. If one has too much foreground he can cut it down; if too little, there is no remedy but to try it again. This is especially true of seashore studies. A long stretch of beach is very effective. In marines the shadows of the waves or ripples in the forewater support, lead up to and give distance to the object. The inlets and yacht landings yield some good character studies in the local boatmen, as well as good chances to secure yacht photographs. The comparatively narrow channel brings the boat within range of the camera.

Along the Beach

I imagine I hear those accustomed to an expanse of flat beach say, "The beach? what is there about it to photograph? to make a picture?" This I will try to answer; but first let me suggest that there are other coasts more ruggedly picturesque than the flat sandy beaches favored by bathers. The rocky New England coast, to say nothing of the Pacific slopes, the shores of northern England and Scotland, have a wild grandeur not found by southern seas. These rugged shores offer opportunities for the expression of sentiments not possible on the sandy beaches. On the other hand, the soft, mysterious sentiments offered by a flat beach find no expression along the more rugged bits of coast. So the worker who desires certain results must choose his place according to his fancy.

Composition

A few general suggestions in regard to seashore composition may not be out of place here. These would apply to any shore. They are not rules, to be followed blindly; simply hints. The camera pointing directly out to sea will usually record long, parallel lines of breakers. This is monotonous, but the very monotony is sometimes desirable. The effect is restful. We can see the waves and breakers rolling lazily in and breaking with a dull, "quiet" roar. This effect does not require much sparkle. But we do not always desire this "monotony." We often wish to express the action, the restlessness, of old ocean. Then avoid parallelism in line. Have the beach line run diagonally across the picture. Select a place where the lines of surf are broken. If possible find a viewpoint where the beach curves, so as to secure an oval composition. Point the camera lengthwise of the beach so as to secure both water and land. Above all, use judgment and *always* experiment. Do not be satisfied with the first view on the ground glass. Move the camera from place to place and select that location which you think will best interpret the impression. For if we photographers would be artists and not mere copyists, we must endeavor to translate our impressions to paper, make our pictures impress others, tell others the story which the view told us — otherwise we simply copy sets of lines, light and dark, blindly record facts — sometimes beautiful but, so far as we are concerned, just as likely to be uninteresting. A mass of rocks, wave-dashed, will impress different temperaments differently. From one point of view it will express one thing; from another, something else. Rocky coasts have always a grandeur not possessed by the long, sandy beaches. In the same neighborhood one can sometimes find both.

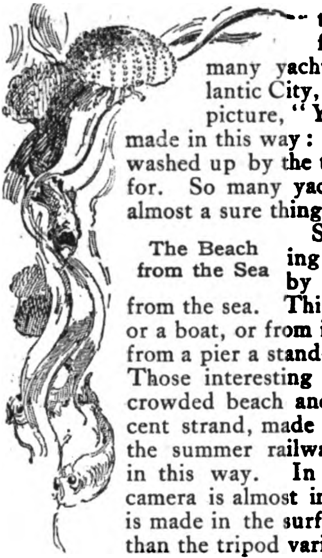
Wooded coasts offer many possibilities. In most cases the trees do not come to the water's edge, but sometimes they do. A strip of pebbly beach backed with woods, with possibly some lines of gulf-weed giving contrast to it, will make a picture.

Most of us are not free agents; and must make our pictures where we happen to be instead of being where we should like to make our pictures. It has frequently been said that the flat beach offers no opportunity for picture-making! For the expression of refined sentiment, it cannot be improved upon. Lacking the rough grandeur of a rocky coast, it has those long sandy stretches, backed by grass-covered dunes, sometimes by trees. Sometimes scorching in the bright sunlight; again wrapped in mist, or shadowed by clouds, any mood may be expressed by it, joy or sorrow, labor or rest.

To record these impressions, atmospheric conditions must be carefully studied. If possible, photograph when those conditions exist. A long, curving strip of beach, with a few breakers in the foreground, the whole backed by a faint suggestion of dunes and shrouded in mist, makes a picture full of tender feeling. Morning is the best time to secure these impressionistic pictures.

Flotsam and Jetsam

The "flotsam and jetsam" of the beach should not be neglected. A few boxes or barrels, pieces of wreckage, the pilings found on many beaches to keep the sea from eating away the land, are worthy of study. In photographing boats from the beach these lines of pilings frequently aid the composition. It will often be advisable to move some boxes or barrels to a certain part of the beach and then wait until vessels pass where we want



them. If the channel is fairly close in shore and many yachts are passing, as at Atlantic City, this is quite feasible. The picture, "Yacht, Atlantic City," was made in this way: the box placed as though washed up by the tide and the boat waited for. So many yachts were passing, it was almost a sure thing.

The Beach from the Sea

Some curious and interesting things can often be made by photographing the beach from the sea. This may be done from a pier or a boat, or from in the sea itself. If made from a pier a stand-camera offers advantages. Those interesting views of Atlantic City's crowded beach and of Cape May's magnificent strand, made by Mr. Rau for some of the summer railway guides, were produced in this way. In a small boat, the stand-camera is almost impossible. If the attempt is made in the surf, a hand-camera is better than the tripod variety. The legs of the tripod sink into the sand; the waves upset the whole thing; plate-holders either fall into the water or are splashed by the breakers; a crowd invariably collects around the instrument, especially in front of the lens; every member of this crowd assumes a stiff conscious attitude, and failure must almost certainly be the result. By all means use a hand-camera. It *may* not be noticed. If it is, make a pretence at exposure, draw the slide beforehand. Protect the whole instrument with the rubber focusing cloth. Some of the older forms of "fixed focus" cameras are well fitted for this kind of work, being practically waterproof in themselves. If the camera is waterproof or is thoroughly protected, one may venture with it beneath the breakers and so secure some interesting results. At some of our most populous resorts as, for example, Atlantic City, the boardwalk or esplanade offers many opportunities for skilful photography. These should usually be made from above the heads of the crowd.

Beach Groups One of the commonest and most enjoyable forms of seashore photography is the "perpetration" of beach groups. There is a fascination about seashore people, seashore *costumes* possibly, which begets a desire to photograph them. This is usually done with the persons posed in ungainly, self-conscious attitudes; looking directly into the lens, with a galvanic smirk doing duty for a "look pleasant" smile. Then again possibly a number of people are "arranged" in an artistic (?) group—piled one above the other to form the much-maligned pyramid, looking as though they were laid out with compass, T square and triangle. A formal arrangement is always bad. It requires an expert to arrange a group so as to look *unarranged*. More than this, it requires the hearty and *serious* coöperation of those photographed, and this is seldom obtainable at the seaside *and* by the amateur. The only way it may be obtained, that I know of, is to let each member of the group thoroughly understand that the success of the picture depends on him, and that he must pay well for it in dollars and cents *before* an exposure is made. Such things, though interesting to the persons concerned, have usually no pictorial value.

Children Seashore children, on the other hand, are always picturesque. Do not pose them. They can do that much better than you can. Pay apparently no attention to them. Watch them at their play. Notice the best point of view in relation to other things. Select the proper moment for exposure, and expose. Do not bother them. Gain their confidence by letting them alone. When you meet them day after day, chat with them; don't be funny; don't "guy" them; dig a hole in the sand for one; make a boat for another. If you like children you will *know* what to do; if you don't,—leave them alone. But you will miss many good things. Children digging in the sand, playing in the pools left by the tide, paddling in the little breakers, *all* these incidents make pictures which appeal to every lover of life's happiest hours.

By using a hand-camera, one can walk among the children without attracting undue attention. If a "fixed focus" box is used, a pose may be snapped instantly

without taking the time necessary for focusing. If the children are accustomed to being photographed, a spot may be selected, the picture composed in the manipulator's mind and the children taken there and posed as desired. The result will seldom equal the ideal, so that several exposures should be made. I usually explain what I want to the youngsters and let them pose themselves, telling them to go ahead and play. They fall into the spirit of the thing much better than "grown-ups" and like being photographed just as much. The picture of two children digging in the sand was made from such a negative, one of a dozen 3¼ x 3¼ made within an hour with these two little girls as models. "A Summer Girl" is from another of these exposures.

Another suggestion is to set up a tripod camera a long way from a group of children at play. Then with a very long focus lens they may be photographed unknown to themselves. "Seashore Puddlers," already referred to, was made in this way with a 24 inch lens.

The Life-boat

The life-boat drill affords an opportunity for pictures of the life-boat in the surf. If one ingratiate himself with the coast guard in his neighborhood (as can be done), a thrilling rescue may be pictured. These men will usually be glad to assist the proper person not only by posing for him but with suggestions which are usually quite practical.

At Cape May, Holly Beach, and some other South Jersey resorts there are colonies of Swedish fishermen who go out through the surf to fish. They are quite sociable fellows, as a rule, and afford some excellent subjects for the serious pictorial worker. Many of my pictures were made after several weeks' watching and a study of light effects and the characteristics and habits of the men themselves. Their confidence is easily gained and they are quite willing to pose. Of course such pictures are best made at different times. They are not chance shots, each being studied and deliberately planned beforehand.

Sea-meadows

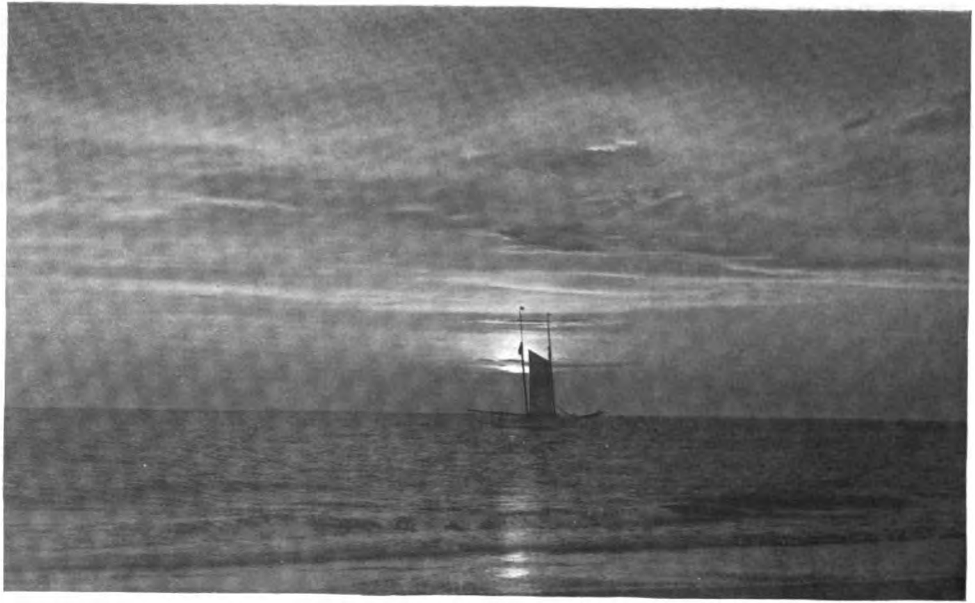
Leaving the beach, let us seek some pictures which are waiting for us in the so-called "meadows" or salt marshes. In crossing these marshes in the train we have probably all been delighted with their peculiar beauty. This beauty depends upon light and shade effects, but more especially upon the varying colors of the grasses. The little waterways with their sinuous courses, their black mud banks riddled with "fiddler" holes or packed with mussels, give contrast. The meadows are interesting under any condition of sky,—sometimes gloomy and sad; at others, bright, joyous, sunlit. Even more than the beach are they dependent upon cloud effects. In some places they are bordered by a few stunted trees. These serve as backgrounds. A background of mist—a gradual fading from sight of an expanse of meadows—suggests "vastness." Shadows of clouds on the grasses, sunny, rippling canals, and, not least, "luscious" *mud* can be welded into pictures *a la* Hinton. In some of the large thoroughfares we will find fishing and crabbing parties, sometimes a native in a "sneak-box" hunting for bait or soft crabs; an oysterman dredging for oysters. How is one to reach these desirable places? That must be finally determined by the individual according to conditions. It is sometimes possible to walk, but usually a boat is necessary. Being particularly partial to sailing, I have found a great deal of pleasure in traveling over some of these waterways in a light draught catboat, sometimes with a small "sneak-box" in tow, for some of these channels are navigable only for the very smallest craft. The tripod camera is seldom used on these trips unless from some previously selected spot on terra firma (to say nothing of the mud). It was found exceedingly awkward, in fact next to impossible, to manipulate the large camera on the sail-boat, so a small fixed focus hand-camera is used. When the desired object is approached the instrument is made ready for instant use. The tiller is operated with one hand, the camera with the other. It requires some skill with both boat and camera, also some nerve, as you risk a ducking. Why not two persons? may be asked: one for the boat and one for the camera? Because the other fellow never can know exactly where you want the boat. "If you want a thing done right, do it yourself." By passing the sheet around the tiller, one can sometimes hold the craft to its course or humor it with one's foot, leaving both hands free for the camera. A boat may be handled intuitively, as can the camera.

Sand Dunes

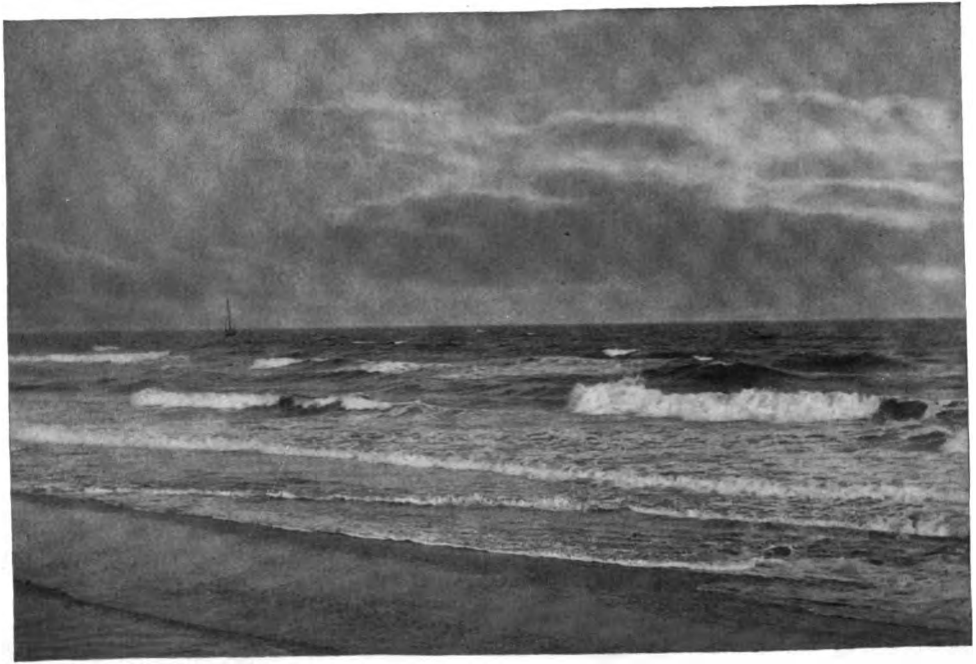
At many places near the shore will be found those interesting geological factors—sand dunes. These are caused by the sand from the beach being carried by the wind, and, lodging against some apparently insignificant obstacle, the pile grows by addition. A scanty vegetation—grass—appears, and still further interferes with the traveling of the sand. After reaching a certain height the sand blows from the tops of these dunes and covers the surrounding fields and meadows. So the dune travels inland, sometimes destroying much valuable land. Plants growing on the top of a dune prevent to a great extent its migration. The windward side of the dune is usually a gentle slope, but the other is quite steep, sometimes precipitous. The vegetation ceases at the edge, and herein lies the picturesque. Such trees as secure lodgment there are usually stunted and curiously twisted by the wind. The surface of the sand pile is furrowed and broken by wind winnows. As the dunes depend upon shadows for their picture qualities, they should be photographed when the sun is low, and usually more or less against the sun. A picture of dunes with a glimpse of the sea beyond is quite effective.

Trees

The vegetation of the shore differs from any other. This is nowhere shown to better advantage than in its trees. Forced to withstand the blasts from the ocean, they are usually rugged, weather-beaten; sometimes twisted and seeming to possess some of the sterling character we are apt to impute to those who go down to the sea in ships. Between storms they are nursed back to life by the moist balmy air and the rich soil.



FAST FALLS THE EVENTIDE
George D. Firmin



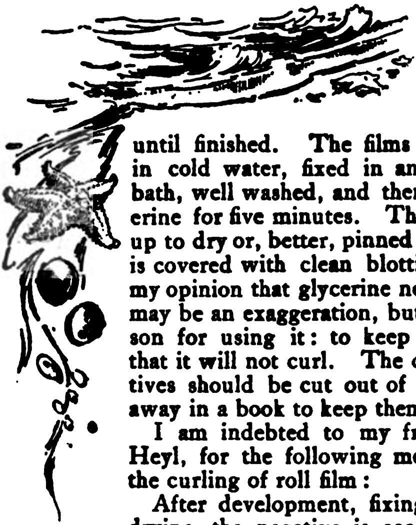
SEA AND SKY
George D. Firmin

Thus we exhaust our survey of subjects at the seashore. The picture lover will find others, but the main classes have been dealt with suggestively. A few words about the development of our negatives may fitly close our excursion by the seashore.

Development

Proper development is always an important factor in securing a good negative; it is especially so in seashore work. Overexposure and atmospheric conditions both tend to cause a flat negative. If such is required (and it often is nowadays), there is no trouble in securing it. But flat or not, the plate must be developed so as to have sufficient printing density. Development is often carried too far. A few trials will show what is correct for the printing process used. Better overdo than underdevelop. It is easier to reduce than to intensify. Of the many developers in use one seems to me to surpass all others. That is old faithful—Pyro. "But it stains your fingers." Yes! "It stains the film." Yes! For the fingers we don't care! For the film—the stain is desirable if there is not too much of it. It certainly improves the printing quality of the negative. An exposure which, if developed with metol, hydroquinone, etc., would give no print at all, will often, if developed with pyro, give a brilliant picture. As to finger staining: it is not necessary. Keep the fingers out of the developer as much as possible. If you *do* get them in pyro, wash them at once, and there will be little staining. Plenty of water on the hands is a good antidote to pyro staining. Use *no soap*.

Films should be developed the same as plates, except that the density should be carried a *little* farther. A great deal has been said about the difficulty of developing roll film. There is no reason for it. If the simple directions accompanying each roll of film are carried out there is no trouble whatever. Briefly, they are: Soak the film in water until limp; then clasping the ends of the roll with a couple of wooden spring clips (such as are used for hanging prints to dry) pass the whole roll face downwards through the developer and back again until developed. If one picture develops before the others, place the roll in fresh water to stop the develop-



ment and cut out the finished negative. The others are placed in the developer again until finished. The films are washed well in cold water, fixed in an acid alum hypo bath, well washed, and then soaked in glycerine for five minutes. They are then hung up to dry or, better, pinned to a board which is covered with clean blotting paper. It is my opinion that glycerine never dries. That may be an exaggeration, but that is the reason for using it: to keep the film moist so that it will not curl. The dry (?) film negatives should be cut out of the roll and filed away in a book to keep them flat.

I am indebted to my friend, Mr. C. C. Heyl, for the following method to prevent the curling of roll film:

After development, fixing, washing, and drying, the negative is soaked for from ten to twenty seconds in a solution of ten grams of glycerol with one hundred and sixty cubic centimeters of alcohol. Quickly drain off the excess solution and press the film face down on a piece of *clean* dry glass, rubbing it with a soft cloth until it sticks nicely. Wait a few seconds and then raise one corner of the film with a knife and strip it quickly from the glass, raising the first corner as little as possible in doing so. It will dry completely (?) in a few seconds more.

The length of time the negative is to be soaked in the solution depends upon the amount of curl it has. If it has not been soaked long enough it will fail to adhere to the glass; and if too long it will have a *backward* curl with the film side convex. If the film is allowed to remain too long on the glass it can only be removed with great difficulty and danger of damage. Film negatives should always be kept flat.

Development should always be done as soon after exposure as possible, especially with color-sensitive plates. If it is delayed for any considerable time, fogged negatives are almost sure to result from the continued light action due to the color-sensitizing medium.

A Developer

The developer which gives me the greatest satisfaction on account of the control which it permits, is as follows: *Solution A.*—Water, 355 c.c. or 12 ounces; sulphite of soda (crystals), 57 grams or 2 ounces; citric acid, 3.6 grams or 60 grains; ammonia bromide, 1.2 grams or 20 grains; Pyro, 28.35 grams or 1 ounce. *Solution B.*—Water, 355 c.c. or 12 ounces; sulphite of soda (crystals), 57 grams or 2 ounces; carbonate potash, 85 grams or 3 ounces.

For normal development use 4 c.c. (1 dram) of A and B to 60 c.c. (2 ounces) of water. For underexposure increase the quantity of B. For overexposure add more water and a few drops of a 10 per cent solution of potassium bromide.

BOOKS

There are no books which deal with photography on or by the sea. The reader who desires an acquaintance with the natural history of the seashore, a most delightful study, should obtain a copy of "The Seashore at Ebb Tide," recently published by The Century Company of New York.

NOTES

We have just published a little booklet setting forth in an attractive way the titles and contents of all the numbers of THE PHOTO-MINIATURE, from No. 1 to No. 28. The booklet is designed to win greater publicity for the magazine and can be enclosed in an envelope of the ordinary size. We will be pleased to furnish a supply of these booklets to any reader who will undertake to enclose an occasional copy in his correspondence with photographic friends.

❧

Our request for information concerning photography at night has not brought as many responses as were expected. We therefore repeat the request and hope to hear from those interested.

THE PHOTO-MINIATURE needs practical information about night photography—photographing outdoors after dark, street views, fountains, special bits, park views or snow scenes at twilight or by moonlight—in other words, all the things a man with a camera can handle out-of-doors after dark. There is a big field of work in this, of absorbing interest, and doubtless many of our readers have done more or less work in this direction.

The information desired must be first-hand experience, not gathered from data already published; must give full details concerning manipulation; and should preferably be supported by an example of actual work. If those who can supply such information will address the editor hereof he will be obliged for the favor.

If money be any inducement, we will gladly set apart twenty-five dollars for the best account of the sort received before the end of August. Not less than 3,000 words, nor more than 5,000 words are desired. MSS.

ANTI-TRUST

**PURE
COLLODION
PAPERS**

MONARCH MATTE

MONARCH
TRADE MARK

MONARCH GLACE

**RELIABLE
UNIFORM
PERMANENT**

Three times quicker printing than any other

Prices same as other Collodion Papers

MANUFACTURED ONLY BY THE

MONARCH PAPER COMPANY

E. & H. T. ANTHONY & CO.
SOLE TRADE AGENTS
122-124 Fifth Avenue : NEW YORK

ANTI-TRUST

not found available will be returned as speedily as possible if postage is enclosed.

◆

At the June meeting of the Photographic Society of Philadelphia, Mr. Edmund Stirling offered his resignation of the secretaryship of the society, on the ground of ill health. The resignation was accepted, and Mr. Robert S. Redfield was elected to serve as secretary pro tem.

Every one familiar with the whole-souled way in which Mr. Stirling has placed his rare powers at the service of the Philadelphia society, during the past six or seven years, will regret this step, and the more since it is made necessary by reason of failing health.

◆

C. R. Baker, Salem, Ohio, sends us particulars of an attractive photographic contest, open to all amateurs and closing December 1. A circular of information can be obtained on request from Mr. Baker.

◆

Photographing fishes in an aquarium is admittedly one of the most difficult feats in photography. In *The World's Work* for July appears a cleverly illustrated paper titled "Photographing Tropical Fishes," by A. R. Dugmore, which contains some of the best examples of this sort of work which we have yet seen. In his account of the method of working followed, Mr. Dugmore gives several interesting hints useful to workers in the same field. The paper is worthy of preservation.

◆

The Photographic Times for July contains an important digest of the laws and decisions covering the "Copyright Protection of Photographs," written by W. A. Miller, a gentleman holding a responsible position in the Library of Congress and therefore entitled to speak with authority on his subject. The paper is admirably arranged for reference to any desired point, and is illustrated with portraits of Mr. A. R. Spofford,

CRAMER'S
Isochromatic
Plates

ARE THE MOST PERFECT COLOR-SENSITIVE PLATES ON THE MARKET

◆

Made in Three Grades of Speed:

SLOW, MEDIUM and
INSTANTANEOUS

◆

For Sale by all Dealers in Photographic Supplies

◆

Manufactured by

G. Cramer Dry Plate Co.

ST. LOUIS, MO.

OFFICES IN

NEW YORK, No. 32 East 10th Street
CHICAGO, Room 705, Cable Building
SAN FRANCISCO, Room 38, No. 819 Market Street

Use Mallinckrodt's Sodium Sulphite Anhydrous
Absolutely Pure for Photographic Purposes

Mr. Herbert Putnam and Mr. Thorald Solberg, with views of the Congressional Library, etc.

◆

The Rev. P. B. Peabody continues, in *Western Camera Notes* for July, his series of interesting papers on photographing birds, with attractive illustrations. We note that our contemporary has removed to "larger and more commodious premises" at 13 South 7th street, Minneapolis, an evidence of prosperity which we record with great pleasure.

◆

Anthony's Photographic Bulletin (W. I. Scandlin, editor) indulges in a new cover of pleasing design, and a photogravure frontispiece, both welcome improvements on the old order of things. The contents of the July number show that the *Bulletin* keeps up its reputation as an interesting and practical journal.

◆

Wilson's Photographic Magazine for August will contain among other attractive features, seventeen full-page engravings reproduced from the work of Langfier, of New York, recently of London. The Langfier studios in Bond street, and at the Hotel Cecil, London, are among the finest appointed of the studios of the metropolis, and their work lies largely among the aristocracy of Great Britain.

◆

A few days ago we had the pleasure of a visit from Mr. E. Lewellin White, managing director of the Photochrome Company, Ltd., London. Mr. White, as chairman of the new Lumière North American Company, is visiting this country to arrange for the location here of an American factory for the manufacture of Lumière plates and other specialties.

◆

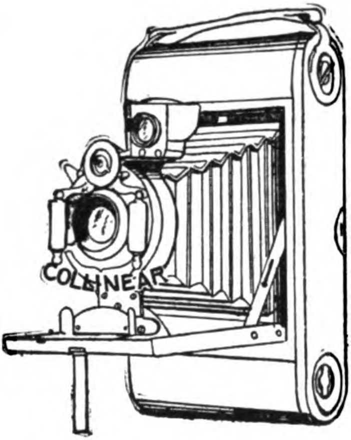
A copy of *Lloyd's Photographic Encyclopedia*, 1901, has reached our table and deserves more than brief mention. Last year Messrs. Andrew J. Lloyd & Co.,

THE COLLINEAR

SERIES II. F 5/6

can now be fitted to the

POCKET FOLDING KODAK No. 3



No. 3 Pocket Folding Kodak, with COLLINEAR II, No. 2 and Unicum Shutter . . . $62.00.

COLLINEAR LENS and Shutter only . . . $48.00.

COLLINEAR, Series III, fits

	LENS AND SHUTTER
No. 2 Folding Pocket Kodak	$38.00
No. 3 " " "	$38.00
	LENS
No. 3 Cartridge Kodak	$40.00
No. 4 " "	$40.00
No. 5 " "	$50.00

A COLLINEAR, Series III
doubles the speed of your Kodak
COLLINEAR, Series II
quadruples it.

Sold by all dealers at uniform prices. For descriptive circular C, write to

VOIGTLAENDER & SON OPTICAL CO.
137 West 23d Street : New York

Boston, Mass., determined to issue a cyclopedia of photographic apparatus and material which, by its usefulness and merit, would serve as a practical advertisement of their business. The result was a portly and handsome volume of over 380 pages, containing many practical papers on topics of interest to amateurs. The book was distributed free to all who would pay the cost of postage, and an unusually large edition melted away like snow before the sun.

The new volume for 1901 surpasses its predecessor in interest and attractiveness, and is an eloquent bit of testimony to the enterprise of its publishers. The book has grown to 400 pages and within its stout covers of artistic design, the amateur may find more information touching the material and apparatus of today than can be seen in any other single volume. The articles by prominent workers in photography are practical and to the point, and the book includes a handy guide to photographic manipulation, with a complete list of over 150 of the best books on photography. A copy may be obtained (while the edition lasts) by sending 20 cents to cover postage to Andrew J. Lloyd & Co., 325 Washington Street, Boston, and mentioning THE PHOTO-MINIATURE

◆

A new and revised edition of Seed's famous "Manual" has been issued for free distribution, and may be had on request from the M. A. Seed D. P. Company, Lucas Place, St. Louis.

◆

Mr. N. C. Hawks, of the California Camera Company, San Francisco, spent a few days in the east last month, and to the scribe fell the honor of showing Mr. Hawks how New York has grown during the past few years. During his visit Mr. Hawks showed us a collection of prints demonstrating the artistic possibilities of *Polychrome paper*, a development paper similar to kallitype, in which he is interested. At present this paper is not readily obtainable in the east, but agencies are being arranged of which our readers shall be in-

Where Weight is Considered

USE SEED'S NEGATIVE FILMS

PERFECTLY FLAT
CANNOT CURL
ACCURATELY CUT
CAN BE USED IN ANY PLATE CAMERA

We supply our 26X, Gilt Edge and Orthochromatic emulsions coated on celluloid and cut to any size desired. Our films are identical in quality with our plates of the same brands. They are much in demand by tourists because of their lightness and convenience. Manipulated and developed same as dry plates.

If weight is a consideration, get our Negative Films for your plate camera. Order through your dealer.

We have just published a new
MANUAL
Send for a copy. Free on request

M. A. SEED DRY PLATE COMPANY
ARROW BRAND

M. A. SEED DRY PLATE CO.
St. Louis, Mo., 2005 Lucas Place
New York, N. Y., 57 East 9th St.

Kindly mention THE PHOTO-MINIATURE

formed in a later issue. The prints we saw were remarkable for their softness and tone quality, resembling old steel engravings of the mellow sort. The manipulation of *Polychrome* in our hands is exceedingly simple, and permits of greater latitude in manipulation and result than some other papers. It should prove as popular in the east as it is in the west when its proper introduction is accomplished.

The Heavenly Twins, a special combination developer introduced by the California Camera Company, has, we learn from Mr. Hawks, been received with much enthusiasm, over 8,000 ounces having been sold during the past year or so.

◆

The Philadelphia Photographic Salon for 1901 will be held in the galleries of the Academy of Fine Arts, Philadelphia, from November 18 to December 14, 1901.

The purpose of the Salon is to exhibit that class of work only in which there is distinct evidence of individual artistic feeling and execution, the pictures to be rigidly selected by a competent jury.

No awards are offered, and no charge will be made to exhibitors. Each exhibitor will be furnished with a catalogue, which will be the official notification of acceptance.

No exhibitor must submit more than ten pictures, each of which *must be framed* separately.

The title of each picture and the exhibitor's name and address must be clearly written on the labels provided, which must be attached by the exhibitor to the back of each picture. Nothing may appear on the front of the picture except the title and the exhibitor's name.

All communications and pictures submitted for exhibition must be addressed to the Pennsylvania Academy of the Fine Arts, Broad Street above Arch, Philadelphia, Pa., U. S. A. Pictures must be forwarded at owner's risk, *carriage prepaid*, and delivered at the Academy not later than 5 P. M., Wednesday, October 30, 1901.

The management will use all reasonable care to pre-

ROSS

NEW EXTRA RAPID SERIES F 5.6

UNIVERSAL

Symmetric Anastigmats

"The most generally useful Lens for the Professional or Amateur Photographer."

THESE New Lenses are aplanatic, working with the Standard aperture F 5.6, superseding the formerly popular Universal Symmetricals in consequence of their freedom from distortion and better covering properties.

No.	Equiv. Focus	Plate Covered with Large Stop	Plate Covered with Med'm Stop	Plate Covered with Small Stop	Prices in London
	Inches				*Dollars*
1	5	3¼ x 2½	3¼ x 3¼	4¼ x 3¼	26
2	5½	3¼ x 3¼	4¼ x 3¼	5 x 4	28
3	6	4¼ x 3¼	5 x 4	6½ x 4¾	29
4	7½	5 x 4	6½ x 4¾	7½ x 5	37
5	9	6½ x 4¾	7½ x 5	8½ x 6½	45
6	11	7½ x 5	8½ x 6½	9 x 7	60
7	13	8½ x 6½	9 x 7	10 x 8	77
8	15	10 x 8	12 x 10	13 x 11	102
9	18	12 x 10	13 x 11	15 x 12	135
10	21	13 x 11	15 x 12	18 x 16	180
11	24	15 x 12	18 x 16	22 x 18	232

Five per cent. discount for cash.

The cost of pairing two lenses for stereoscopic work is $2.

The Circle of Illumination includes an angle exceeding 70°

ROSS LTD.

Manufacturing Opticians

111 New Bond Street London, W., Eng.

SOLD BY LEADING DEALERS EVERYWHERE

vent any loss or damage to pictures in its charge, but will not be responsible for such occurrence.

Foreign contributors are requested to submit their pictures, *unmounted, by post.* The management will suitably mount and frame them before exhibition, at no cost to the exhibitor, and will afterward return them by registered post.

Jury of Selection: Mr. Charles I. Berg, New York; Miss Frances B. Johnston, Washington; Mr. Allen Drew Cook, Mr. George W. Hewitt, and Herbert M. Howe, M. D., Philadelphia.

◆

The Appellate Division Court, at Rochester, N. Y., has decided that no person has the right to use for business purposes the picture of a woman, without the consent of the person whose features are reproduced, and that such unauthorized use gives sufficient cause for action. The case in question, that of Abigail Roberson, against the Rochester Folding Box Company and another, was brought to recover $15,000 damages for the unauthorized use of her portrait for advertising purposes. Miss Roberson will now prosecute her suit in the Supreme Court to collect damages. This decision is interesting to all who photograph and should be noted.

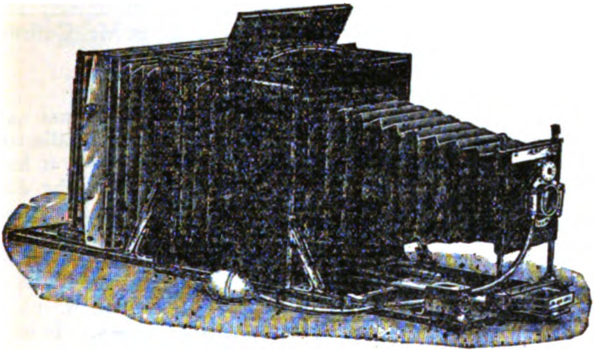
◆

The C. P. Goerz Optical Works notify us that they have just completed their 100,000th double anastigmat, a No. 9 Series III lens of 24 inches focal length. The event was marked by a celebration at the factory. When it is recalled that barely eight years have passed since the first introduction of the double anastigmat the significance of the above fact will not escape the reader. It gives striking evidence of the photographic world's opinion of the value of the double anastigmat.

◆

Mr. William C. Cullen, 61 William street, New York, sends us a dainty booklet, the twentieth edition of "Everything for the Camera." It is an unusually compact list of specialties handled by Mr. Cullen at his

High-Grade Apparatus



The Long Focus Reversible Back

MONTAUK CAMERA

FEATURES:

Convertible Lens, Unicum or "Auto" Shutter, Rising and Shifting Front, Reversible Back, Rack and Pinion, Double Extension Bellows.

PRICES:

Folding—		Cycle	
4x5,	$40		
5x7,	50	5x7,	$40
6½x8½,	60	6x8½,	50
8x10,	70		

GRAY DAY SERIES

Fitted with

ROSS GOERZ LENSES

F 6.8 to 7.7

For Views, Portraits, Copying

OR

Collinear Lenses

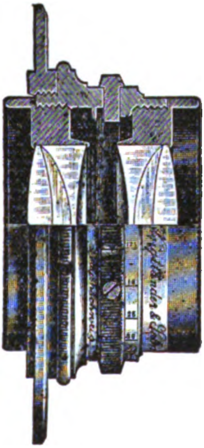
SERIES II. F 5.6 to 6.3

The Fastest Lens Made

Send for Lens Catalogue ***Send for Camera Catalogue***

G. GENNERT, 24-26 E. 13th St., New York

Kindly mention THE PHOTO-MINIATURE



two stores, conveniently arranged and attractively set forth. A copy may be had on application to Mr. Cullen.

❧

In continuation of the series of special annual exhibitions organized by the Museums and Galleries Sub-Committee of the Corporation of Glasgow, it has been decided that this year the exhibition shall be devoted to the art of photography and its applications. The range of the exhibition is far-reaching, since it embraces portraiture, figure-studies, architecture, landscapes, stereoscopic prints, lantern slides, micro-photography, and illustrations of the application of photography to technical and scientific purposes. It will also include examples of the different photo-mechanical processes used in reproduction. The exhibition will be held in the Glasgow Green Branch Museum (People's Palace). It will be opened about December 20 next, and will continue for a period of not less than three months. Any pictures lent will be received and exhibited free of cost to contributors; cases or frames will be provided for specimens which may require such protection, and the carriage of such pictures lent as may be specially arranged for will be defrayed by the committee. The Glasgow Corporation offer prizes and certificates of merit for the best examples of photography in the following classes: (1) Landscape, (2) Portraits and Figure Studies, (3) Architecture, (4) Instantaneous Photographs of Objects in Motion, (5) Lantern Slides, set of six. The competition is for amateurs and professionals alike, without restriction. All contributions to the exhibition and specimens for competition must be delivered at the Glasgow Green Branch (People's Palace), Glasgow, not later than November 30.—*Amateur Photographer.*

❧

The Bromide Monthly is a new photographic journal edited by Juan Abel, and published by the Rotograph Company, New York, at $1 per year. We quote from the announcement in the first number:—

"*The Bromide Monthly*, as its name implies, will be

THERE ARE NOW IN USE OVER

234,000
LENSES

manufactured by
the Bausch & Lomb Optical Co.

This enormous number represents only Bausch & Lomb-Zeiss Anastigmat, Rapid Universal, Alvan G. Clark, Rapid Rectilinear, Portrait, and Wide Angle Lenses, and does not include the millions of simpler photographic lenses produced.

THE POPULAR VERDICT, as expressed by actual purchase and use, is that our lenses are practically WITHOUT A RIVAL.

OUR PRODUCTS ARE OBTAINABLE FROM ALL DEALERS

CATALOGUE FREE

Bausch & Lomb Optical Co.
ROCHESTER, N. Y.

NEW YORK CITY
Broadway and 28th St.

CHICAGO
State and Washington Sts.

Kindly mention The Photo-Miniature

devoted to the record of progress in bromide photography, but it will not exclude matters of interest in other branches of the art, such as negative-making, etc. It will be unillustrated, save for the frontispiece, which will consist every month of a Rotograph bromide print. It will give formulæ for obtaining the best effects on bromides and for toning them. It will treat of enlargements and of contact prints. It will not endeavor to take the place of any existing periodical, but will treat of a special branch of the art of photography, because the editors believe that in bromide paper—of which Rotograph is one of the best examples—both the professional and amateur will find the paper of the future."

The new journal follows the example set by THE PHOTO-MINIATURE in its reasonable size, 5 x 8 inches; offers much useful information, and is attractively printed and bound in a brown cover of tasteful design. Those who have wondered how THE PHOTO-MINIATURE will find material sufficient to keep up its series of monographs will doubtless wonder still more how Mr. Abel will manage to talk through four seasons yearly concerning bromide paper. In this first issue he makes a good beginning, and deserves congratulation on the artistic makeup of the paper.

❧

The address of the new store opened by Messrs. Henry Kahn & Co., New York, should be 189 Broadway and not 89 Broadway, as the printers' types made us say on page 142 of our June issue.

❧

The Photographic Art Journal, published at Leicester, England, has developed into a decidedly interesting paper for all interested in picture-making by photography. The numerous illustrations, evidently chosen with great care, are printed on coated paper with a mat surface which yields prints of most desirable softness and delicacy. The *Journal* is obtainable in this country from Spon & Chamberlain, 12 Cortlandt St., N. Y., and we would suggest that our picture-loving readers should invest 15 cents in a specimen copy.

Trade Mark

Actien-Gesellschaft für Anilin-Fabrikation, Berlin S. O.
Photographic Department

Manufacturers of the patented

Agfa-Intensifier. Name protected.

The One Solution Intensifier.

Agfa-Intensifier is a clear, colorless solution, which for use is diluted 1 part with 9 parts of water. In this the negative to be intensified is immersed, and intensification commences immediately, continuing for about 10-15 minutes, when the process is complete and the plate must be withdrawn to avoid veiling.

Agfa-Intensifier does not stain, and the whole process is absolutely complete in the one manipulation; it only remains to wash the negative.

Of all dealers.

2 oz.	4 oz.	8 oz.	16 oz.
$ 0.35	$0.60	$1.00	$1.75

Testimonials.

Mr. Jacob Schloss, New York, writes: Gentlemen: I have tried your **"Agfa"-Strengthener** and find it works splendidly, far better than the old time Mercury and Ammonia or Soda, and shall continue it.

Mr. F. W. Guérin, St. Louis, Mo., writes as follows: Gentlemen: Replying to yours of the 12th inst., the **Intensifier** is all right. I had been using the intensifier some time before you sent me that sample.

Agfa-Reducer. Name protected. Patented.

"A novel and simple process of Reduction for Plates, Slides, or Bromide Papers."

"Always ready for use, and instantly prepared."

Only to be dissolved in 10 parts of water.

Complete reduction takes about five minutes.

Of all Dealers.

$0.80 per original bottle of 4 oz. with **screw-lid and hollow glass-stopper, serving as measure.**

$1 per box of ten glass-tubes containing ten grams each.

EIKONOGEN ★ AMIDOL

RODINAL ★ DIOGEN

★ IMOGEN ★

Photo-Facts is an occasional journal published for free distribution by Pinkham & Smith, 288 Boylston St., Boston, Mass. The June issue contains an illustrated paper on photography with Eastman's Panoram-Kodak and other features of interest to the amateur photographer. Messrs. Pinkham & Smith have a beautifully equipped store facing Boston's famous common, the photographic department being in charge of Mr. Waldo, whose wide acquaintance with photographic manipulation is much appreciated by the amateurs of Boston and locality.

❧

A profitable suggestion for those who love flowers and photograph them is found in the following note by Will A. Cadby, reprinted from *The Amateur Photographer:*

Those who, walking down New Bond street, are looking for the Continental Gallery—which at the present moment holds three most delightful little exhibitions—cannot fail to be attracted by the original posters that are to be seen at the doors; for of late, on the hoardings, at least, there seems to have been a return of the old-fashioned and totally inartistic illustrations of advertisements. These fresh and brilliant bits of color are true heralds of the good things to be seen inside the gallery.

But these present notes are only concerned with a few of the pictures of one of these three exhibitions, for I propose to confine my remarks entirely to the twelve paintings by Mrs. Lily Hartrick, entitled "A Year in the Garden." In this collection of pictures by Mr. and Mrs. Hartrick there are many more ambitious, and possibly more able, works than these flower studies; but this collection of the year's flowers seems so comprehensive and satisfactory that it is complete in itself.

Taken separately or collectively, these twelve paintings are entrancing, and the flower chosen for each month is entirely differently treated.

Beginning with January, we have a delicate study of Christmas roses, the very sight of which makes one glad that such lovely flowers really bloom at so inclement a time of year. The group of snowdrops, representing February, are delightfully and chillily rendered, and the

$610 Cash Competition

WITH GRAND PRIZE OF $200 IN CASH

for Prints on

"ROTOGRAPH"

Bromide Paper

Send 2-cent stamp for particulars of Competition, or

Better still

Send 10 cents for sample package of "Rotograph" Paper, circular of Competition and copy of our new magazine

"The Bromide Monthly"

* * *

"ROTOGRAPH"

B. RUSSEGER } *Selling Agents*
E. S. MAPES

101 Fifth Ave., New York

Kindly mention THE PHOTO-MINIATURE

warm glow of the jonquil of March readily suggests lengthening and brighter days. April's wild hyacinths naturally follow, and a perfectly lovely panel of fruit blossoms proclaims May. But the pictures denoting the latter half of the year seem to me the most interesting. July and August are full of blazing summer color, which ripens into mature richness in the late poppies of September, and even begins to pale a trifle in the October sunflower. This is a most interesting picture. Only part of the flower is seen, on which is painted a spider and its web, where hang dead flies, the whole suggestive of autumn and decay.

The subdued tones in the anemone of November tell of coming winter, whose arrival is so charmingly expressed in the December's chrysanthemum.

Here surely are lessons enough for the flower photographer. Twelve delightful studies of flowers and not a vase amongst them, and yet infinite difference of design and treatment. One, a group of flowers, with even a distance suggested; another, a part only of one single flower; another, a Japanesque panel; and yet another, a vague, idealistic, luminous collection of colors, which suggests at once nasturtiums to the sympathetic.

The photographer, fresh from his lessons on composition, will exclaim, "But this is not right; that is too near the middle," and so on, not realizing that the artist learns composition only to forget it. When the photographer finds he can pick a hole in the composition it is often for the reason that the artist is consciously violating a rule for the sake of being convincing, in the same way that tautology sometimes finds its place in literature.

❧

A flourishing school of photography is one of the features of the season at Eagles Mere Chautauqua, Sullivan county, Pa. This school was opened a few weeks ago with an exhibition of one hundred selected examples of photographic work by well-known amateurs, and the course of instruction is under the personal supervision of Mr. J. Horace McFarland, assisted by Mr. O. P. Beckley. The opportunity to secure a practical course in photography and a holiday

Thousands of photographers
are using

LOVELL
COLOR DIFFERENTIATING
PLATES

with better results and greater satisfaction than they had from any other orthochromatic plates

FOR ALL PHOTOGRAPHIC WORK
WHERE COLOR IS CONCERNED
OUTDOORS OR INDOORS, IN
PORTRAITURE, COPYING,
LANDSCAPES AND INTERIORS

Positively the best orthochromatic plates in the market. Sensitive to the entire spectrum; giving brilliant negatives; simple in manipulation.
A trial will convince.

May be had "backed" on request in two speeds
C. D. "FAST" and C. D. "MEDIUM"

OBTAINABLE FROM DEALERS OR DIRECT FROM FACTORY
SEND FOR PRICE-LIST AND SPECIAL CIRCULAR

LOVELL DRY PLATE MFG. CO.
NEW ROCHELLE, N. Y.

Denver: Hart Bros. & Wells.
Western Depot: 64 Wabash Avenue, Chicago.

Kindly mention THE PHOTO-MINIATURE

in one of the coolest spots in the east is an unusually favorable one.

◆

"Rotograph," 101 Fifth Ave., New York, announce a special competition open to all users of Rotograph bromide paper; $500 in cash and $110 in Rotograph paper are offered as prizes. The competition closes November 15 next, and the conditions of contest are few and simple. A circular of particulars can be had on application to "Rotograph" Company.

◆

The American Aristotype Company, Jamestown, N. Y., has issued a new and enlarged edition of the *Aristotype Manual*, copies of which may be had for the asking. In this new edition all the later specialties of the A. A. Company are described at length, and the book is without doubt the most complete exposition of the manipulation of print-out papers yet published, although limited to the specialties of this company.

◆

The Voigtlaender & Son Optical Company has removed to a new factory at 137 West 23d St., New York, where it has larger space for the accommodation of its increasing business. The winners in its recent competition open to all users of Collinear lenses are announced as follows:

Fifteen dollars in cash for the best print, 5 x 7 size or over, showing high speed instantaneous work, to Mr. S. Seaman Jones, New York city. Subject: Trotting horses making 2:30 record, *f*/5.6, exposure 1/600 part of a second. Collinear Series II.

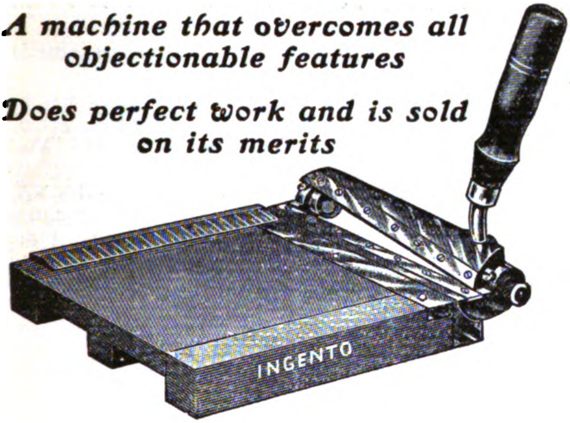
Fifteen dollars in cash for the best print, 5 x 7 size or over, showing time work, ½ second exposure or more, to Mr. George D. Morgan, Wilmington, Del. Subject: Store interior, *f*/32, 20 minute exposure by electric light. Collinear Series II.

Ten dollars in cash for the best print, 4 x 5 size, showing high speed instantaneous work, to Mr. George C. Embody, Hamilton, N. Y. Subject: Birds at 16 to

SOMETHING NEW

A machine that overcomes all objectionable features

Does perfect work and is sold on its merits



The INGENTO BEVELER

Just what the trade has been waiting for — a perfect cutter built on mechanical principles. Cuts towards the scale top instead of away from it. The knife can never get away from the cutting edge: this prevents buckling of the paper or card. The angle of the knife can be quickly changed to cut a perfect bevel.

THREE MACHINES IN ONE

PAPER TRIMMER, CARD CUTTER
AND
CARD BEVELER

With this machine you are the entire master of the card situation—you are your own manufacturer.
Will cut tissue paper or ten-ply board.

Size	*List price*
8-inch	$5.00
10 "	7.50
12 "	10.00

BURKE & JAMES

Manufacturers of Photographic Apparatus and Supplies
118 to 132 W. Jackson Boulevard, CHICAGO

Kindly mention THE PHOTO-MINIATURE

28 inches distance, *f*/5.6, exposure $\frac{1}{100}$ part of a second. Collinear Series II.

Five dollars in cash for the best print, 4 x 5 size or under, time work. Subject: Child's portrait, *f*/5.6, exposure over ½ second. Collinear Series II. Mr. Frank E. Bronson, Painted Post, N. Y.

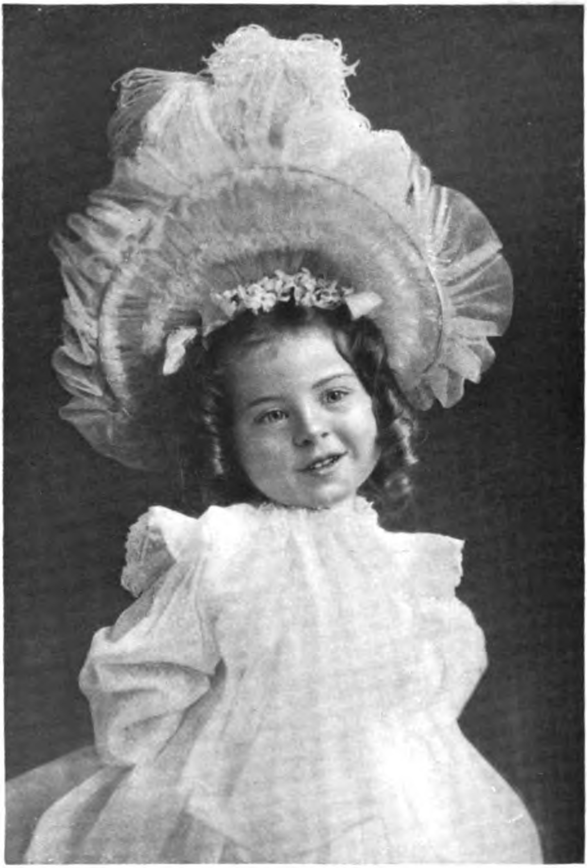
Five dollars in cash for the best print made with No. 2 or No. 3 Folding Pocket Kodak or No. 3 Folding Weno Hawkeye camera, to Mr. Warren E. Hill, Brooklyn, N. Y. Subject: Bridle path, Prospect park, Brooklyn, N. Y., *f*/6.8, exposure $\frac{1}{100}$ of a second. Collinear Series III.

Judges: Messrs. Alfred Stieglitz Dr. Theodore G. White and W. W. Comstock.

❧

The Stereoscopic Photograph is the title of a new quarterly magazine, the first number of which has just been published by Messrs. Underwood & Underwood, 5th Avenue and 19th street, New York. Price 25 cents per copy, or 80 cents per year.

Although published in part to make known the business of its publishers, the beauty and interest of this journal merit for it the support of all interested in the revival of stereoscopy. Looking through its pages, of ample size and charmingly illustrated, one feels that at last the stereoscopic photograph is adequately represented and its educational value placed before the public in a way proportionate to its importance. The system of stereoscopic tours of famous cities or localities announced in the new magazine is one which will appeal especially to those who are denied the pleasures of travel. We hope the new venture will receive the support it deserves and that we may enjoy its visits for many years to come.



FLASHLIGHT PORTRAIT. No. 2
E. D. Waters

The Photo-Miniature
A Magazine of Photographic Information
EDITED BY JOHN A. TENNANT
Volume III AUGUST, 1901 Number 29

FLASHLIGHT PHOTOGRAPHY

The story of flashlight photography tells how the photographer, chafing under the limitations of an art largely dependent on sunlight for its successful working, devised a means of bottling the sunlight, so that he might be free to use his camera when and where he pleased— as at night, in dark interiors, in underground places, or wherever the light of day proved insufficient for his purposes. It is an interesting story, but we will here concern ourselves with it only sufficiently to get an intelligent grasp of the usefulness and convenience of the flashlight, as a means of adding to our pleasure in photography, and as a help in the work of the world.

When Niépce, in 1827, showed the first photographic pictures before the Royal Society, he explained that their production required exposures of six hours in sunlight. This necessarily limited the field of the new art to copying prints and an occasional landscape. Such, in fact, were the prints shown by Niépce at that time. Twelve years later Daguerre, by his process, reduced the time of exposure to thirty minutes. This was an advance, indeed, but did not admit of photographing objects having life or motion. As soon as Daguerre's process reached America efforts were made to further reduce the exposure time. In 1840, J. W. Draper succeeded in obtaining a portrait of his sister with an exposure of one minute. The camera was improvised from a cigar box, and Miss Draper prepared for the ordeal by powdering her hands and face, and donning a white dress and bonnet. The result was a triumph for photography and for America! This first sun portrait of the human face was made on the roof of the old University building, in Washington Square, New York, and is still in existence. Its production enlarged the field of photography to include portraiture from life. Within ten years instantaneous photography—the photographing of rapidly moving objects—was accomplished, as when Dady, in 1851, photographed the steamboats plying in the harbor of New York, "depicting the moving wheels, the waves and spray," says a contemporary, "sharply and clearly defined as if standing still."

These achievements, wonderful as they were, demanded sunlight as an absolute essential in their accomplishment. When the dull days came, or the camera had to be used indoors, the possibilities of photography shrank within extremely narrow limits, and the photographer found himself powerless for lack of light. His plates were made more and more sensitive, but this afforded only partial relief,—there were so many things which could be photographed only when an abundance of daylight was available. What was needed was a method of storing daylight, so that it would be on tap when and where it was required.

The Birth of the Flashlight

In 1859 a ray of hope appeared in the suggestion, made by Bunsen and Roscoe, that the metal magnesium offered a source of light which should be useful in photography. The suggestion was quickly taken up and turned to practical account. Magnesium at that time was simply a scientific curiosity, and had no use save as a means of producing a brilliant light. It has an enormous affinity for oxygen and is therefore easily combustible, its combustion producing a light of great intensity, rich in actinic or photographic power. On these properties of magnesium (and later, of aluminum) all flashlight photography is based. The different varieties of flashlight, other than plain magnesium in powder or ribbon form, are compounds of magnesium or aluminum with other ingredients calculated to assist in more rapid or more complete combustion, to reduce the amount of smoke following the combustion, or to increase or modify the intensity or color of the light resulting from its use.

At first magnesium was made in the form of thin wire for convenience in handling, and sold at 50 cents per foot. In 1863–64 Brothers, of Manchester, showed a copy of an engraving made with strips of magnesium burnt in a darkened room, the exposure being fifty seconds. Later, this experimenter found that, if the wire was flattened into the form of thin ribbon, it gave more equal and rapid combustion. This suggestion was generally adopted and magnesium ribbon became a commercial article. With magnesium in this form Brothers made a portrait of Faraday, at a lecture before the Royal Society, and a series of stereoscopic photographs of a mine in Derbyshire. This was in 1864 and the plates used were, of course, the comparatively slow collodion plates of that period.

In 1865 C. Piazzi Smyth obtained good photographs of the Royal Chamber, in the interior of the Great Pyramid, with magnesium; as did Edward L. Wilson some years later. Wilson also gave, in his *Philadelphia Photographer* (1865–66), a family group made by magnesium light in an ordinary sitting room. This group was equal to much of present-day flashlight work in quality, and its publication attracted widespread attention to the usefulness of magnesium as an aid in professional photography.

Evolution

With the development of flashlight photography came several improvements. Magnesium ribbon gave place to powdered magnesium as more convenient to handle and offering greater efficiency. Lamps were devised for the use of this form of magnesium, demonstrating its advantages over the use of ribbon. The first magnesium powder was rough and really consisted of filings from thin sheets of the metal; the powdered magnesium of today is smooth and even in its granularity. Plain magnesium powder is largely used today by those who object to the more dangerous flashlight compounds, or for purposes wherein its disadvantages are of little importance. In England, where the compounds have obtained little or no favor, magnesium in powder and ribbon form is used almost exclusively. Magnesium ribbon is comparatively little used by American workers today, save as a means of local lighting in difficult interiors and similar special uses. In England, on the other hand, it is in general use among amateurs, and there are in the English market many lamps or contrivances offering convenience and efficiency in its use at a slight cost. A variety of these devices may be seen in English catalogues, such as that issued by Fallowfield.

After powdered magnesium came the flashlight compound, prepared by mixing powdered magnesium with potassium chlorate and various metallic sulphides such as sulphide of antimony, etc. The admixture of these highly oxidizable substances with magnesium, to quicken its combustion and increase its luminosity, seems to have originated with Traill Taylor, who suggested the mixture in 1865 or thereabouts. If I am right in this, then Traill Taylor may be regarded as the father of modern flashlight compounds. By American and continental photographers these compounds, despite their dangerous character, are generally preferred before plain magnesium. The claims made for their superiority over plain magnesium are: that they are more readily and more completely combustible; and that they give a more intense illumination with less dust and smoke than magnesium. These points are disputed, but experience plainly pronounces in their favor for practical work. Since the introduction of these compounds the use of the flashlight as an artificial illuminant in photography has steadily increased year by year, until we have to-day studios in America and Europe where the flashlight is largely or exclusively used in portraiture and genre work. There are, indeed, those who say that sooner or later the flashlight will displace daylight in professional studios — but this may be taken with a grain of salt. It is certain, however, that the advantages offered by flashlight photography will cause this method to increase its popularity very largely as its merits become known.

What is here said about flashlight work will apply equally in the use of plain magnesium or flashlight compounds save when otherwise stated. It is presumed throughout, however, that the reader will use one of the many good commercial "compounds" readily obtainable. The manufacture of compounds for home use is not advised, nor will formulæ for this purpose be given herein, because of the great danger attaching to their preparation even in skilled hands. The purpose of this little book is, therefore, to set forth the advantages and uses of flashlight photography so simply and so plainly that the amateur and professional photographer will find herein all the information necessary to successful work. With this preliminary, let us take up our task, and inquire what may be done with the flashlight, how to go about it, and the tools necessary to its successful manipulation.

Average Results

Let me emphasize the word *successful*. Most of the flashlight work we see, especially that made by amateurs, is unsuccessful in that it requires so many apologies. It is customary, in fact, to regard flashlight work as something which, in the nature of things, cannot be seriously compared with daylight photography. In so far as this opinion is based on the average flashlight work in circulation, it is plainly reasonable. But, as a matter of fact, there is no reason why flashlight work should not equal daylight work in quality: more difficult in its attainment, certainly, but none the less possible and practicable, as the illustrations in this issue go far to prove. It should be mentioned that in reproduction the originals from which our illustrations were made have suffered considerably, despite the greatest care on the part of engravers and printers. Those who are familiar with what Guerin, of St. Louis, has done with flashlight in genre will see therein another proof that good flashlight photography can be placed alongside of good daylight work without excuse or apology.

Causes of Failure

Why, then, is there such glaring disparity between average flashlight and average daylight photography? The question is not difficult to answer. On the one hand, photographers have made themselves familiar with the handling of daylight, and have studied its management under every possible variation and condition. It is a power which they have learned to control by long years of daily practice. The use of the flashlight, on the other hand, is yet experimental; a method of photography with which few professionals or amateurs are practically familiar. Under such conditions it is natural that the average worker should have less success with flashlight than with daylight. But if the problems of flashlight photography are studied with the same care and persistence given to daylight work, it is unquestionable that equal satisfaction and success will follow.

Again, in flashlight photography the handling of the flash powder, lamps and other apparatus is really a minor point, although essential. The real essentials are a knowledge of the illumination of the subject, and the exposure and development of the plate. To the man who has already mastered these problems in his daylight work, flashlight photography will present few real difficulties. As flashlight photography is generally done, the worker's attention is devoted to the machinery, because of its unfamiliar aspect and working. Properly this should be handled as familiarly and as unconsciously as the camera is handled in daylight work, so that the attention may be concentrated on the subject and its illumination. Then we may expect successful results, not before. All this I hope to make familiar as we go along. Meanwhile, let the reader go to his Inglis for the principles of "Artistic Lighting," with the assurance that without a familiar knowledge of the illumination of his subjects all his flashlight wisdom will be unavailing towards success.

There are other reasons why the average flashlight photograph is so disappointing. It will profit us to delay a few moments to glance at these before considering practical work. One of these is the variety of rubbish offered to the unwary under the guise of flash lamps and flash apparatus. Some of these are obviously inadequate for serious work, and fitted only to relieve the tedium of an idle hour. In flashlight photography we seek to replace the abundant and all pervading light of day with an artificial illuminant measured out in a teaspoon. Let us be sure that we choose apparatus fitting the work we have in hand, which will give us all the light we need, in the right way and at the right moment. More flashlight work is spoilt in the making by poor apparatus than from any other cause. At the same time the reader should beware of the many costly and cumbersome contrivances in the market. Some of these are good, others are devices made to sell to the generous hearted at a handsome profit. We will discuss this more fully in considering lamps.

A further and fruitful course of failure is found in the childish and tentative way in which flashlight work is usually undertaken. The amateur, barely familiar with photographic manipulation under normal conditions, or the professional, accustomed to handling a hundred square feet of light area, buys a dollar flash lamp with a few ounces of powder and, by following the alluring directions on the labels, expects to win success under admittedly difficult conditions. It were better to leave flashlight photography severely alone than to attempt it in this way. Its problems cannot be solved in so free and easy a fashion.

Getting down to Facts

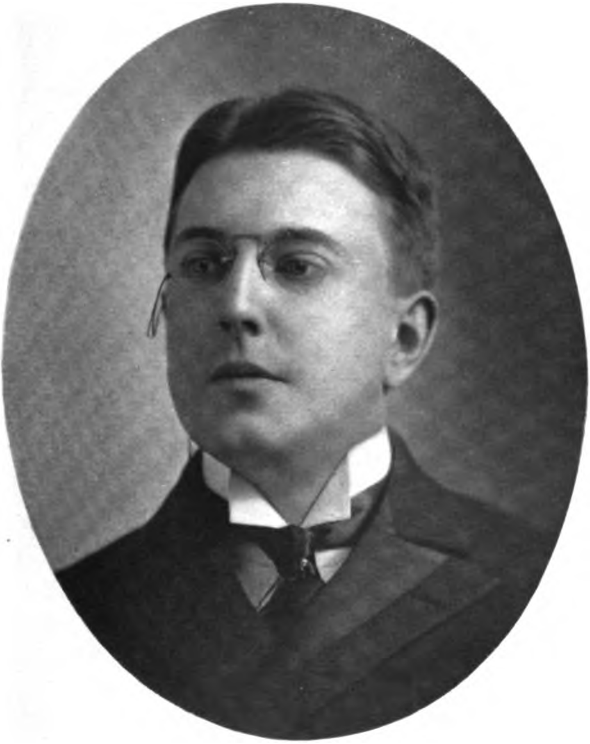
It should be clearly understood from the beginning that even with the best of tools and equipment, flashlight photography is a difficult art. Certainly it offers quite as many discouragements as may be encountered in any other branch of photography. The first results are generally so unspeakably bad that the method is condemned as without virtue or other redeeming quality. But the difficulties can be overcome with a little care and patience. And when the photographer once understands flashlight photography, he will agree with me that it is very much worth the pains and trouble encountered in its mastery. It will do all that daylight photography can do indoors, with identical results as far as quality of work is concerned; and it will do many things which are plainly impossible when we are dependent on sun or daylight. Even buildings and outdoor scenes have been advantageously photographed by flashlight. It gives us, in short, independence of daylight, or location. We can choose our own time and place. And, if the problem of illumination is overcome, it matters little what our subject may be,—a lively baby or a score of babies, a group of fifty people bent on fun, the interior of cave or tomb, animals or still life subjects,—

we can always be certain of success. Is not this very much worth the knowing?

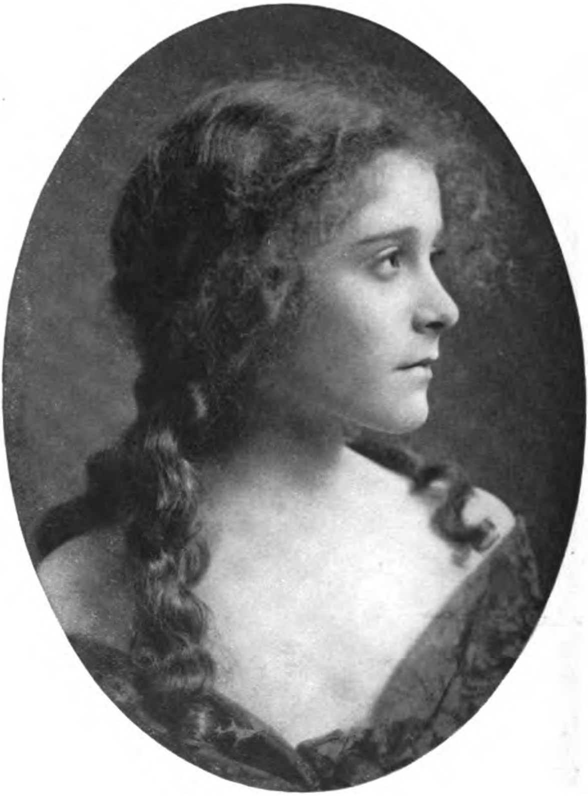
Apparatus What apparatus do we need? A moderately quick lens; a camera easy of manipulation; a brand of plates and a developer with whose working we are perfectly familiar (no room for experiment here); a couple of backgrounds for portrait or figure work; a reflector and diffusing screen for occasional use; one or more flash-lamps, and a supply of powder. The accessories, such as grounds, reflectors, etc., will vary according to circumstances. For general use we may safely provide: a piece of dark gray or black felt, 6 ft. wide by 12 ft. long, tacked to a light pole, which can be suspended from the picture-moulding of an ordinary room; a piece of unbleached sheeting of the same size, fixed in the same way, for the same purpose; and a smaller piece of bleached sheeting, 4 x 6 ft., for a reflector. The arrangement of these accessories will be referred to later.

Lenses Any good rectilinear lens will serve all ordinary needs. For portraits, groups of three or four people closely arranged, three-quarter and full-length single figures, a Dallmeyer RR, No. 8, is an excellent instrument. The mention of this particular lens will enable the reader to judge the capacity of his own lens or any other at hand for the purpose. Such a lens can, of course, be used for larger groups if we can get back a sufficient distance from the subject, as in illustration No. 5, which was made in a chapel. Where space is restricted, as in illustration No. 7, a wide-angle lens, such as the Dallmeyer No. 5, will perform the work. I have used many lenses, some even guiltless of a maker's name, and have gotten equally good results, so that the maker's name is of no practical importance. Some of the best flashlight pictures in my collection were made with a Kodak No. 4 and the lens accompanying the box. And I have an old Darlot portrait-lens, bought for a couple of dollars, which has given me many very satisfactory negatives. In short,—always remembering that the better the lens the better the deed,—any lens will yield good results in flashlight

19



FLASHLIGHT PORTRAIT. No 1
E. D. Waters



FLASHLIGHT PORTRAIT. No. 3
E. D. Waters

work, provided of course that it has no obvious defect such as would unfit it for ordinary work. So I say: use the lens you have, or, if you must buy one, buy the best you can afford. I do not use a cone or lens shade on my lens, but believe that a simple shade, such as the Nicholson Lens Shade, could be used to advantage in preventing reflection of the light from striking or entering the lens in many cases. The point of supreme importance is to know the lens thoroughly and handle it intelligently, making allowance for its peculiarities just as you would do in daylight work. Any difference in speed between two lenses, if not too great, can be compensated for in the development of the negatives. It is often worth a great deal to know how to adjust things in developing negatives made under abnormal conditions, and we will give this special consideration when we reach it.

Cameras

What is true of the lens is true of the camera for flashlight work. Any reliable camera will do all we require if we know how to handle it. There are, however, two points which must not be overlooked. The ground-glass screen must be easily and readily adjustable or removable, so that when ready to put in the plate-holder there need be no time lost, nor unnecessary exertion, nor liability of movement in the camera. This is vitally important, for when everything is ready for exposure every fraction of a second counts. For the same reason, I advise the use of some sure means of holding the tripod absolutely firm and steady. Mellen's tripod stay is here not only a convenience, but a necessity. It will keep the tripod legs from sliding on a smooth floor, and from a chance kick or stumbling foot. These two details are of importance because delay or slip of any sort between focusing and the flash will almost invariably cause the loss of the picture. I ran no risk and lost no time in fixing things when making illustration No. 6. This applies also to groups. They are quite as difficult as animals, and a momentary hitch or slight delay at the camera will start a flow of wit, and all chance of success will be utterly lost.

Plates Whatever brand of plates be used I strongly advise that every plate should be backed unless a nonhalation (double-coated) plate be employed. There are reasons for this apart from the intensity of the light. The prolonged development frequently required in flashlight negative making will often bring out a certain amount of halation which might possibly not appear in quick development. And the delicate tones of the plate may be more easily and more certainly retained in a backed plate than in one not so protected. There are now several good backing mediums on the market, such as Newcomb's, or the formula given by Mr. McFarland in THE PHOTO-MINIATURE No. 13. There are also many reliable brands of nonhalation or double-coated plates, such as Seed's, Cramer's or Hammer's, and these are much more convenient than backing plates for one's own use as required. Until a year ago I used to back my plates with a mixture of lampblack and alcohol, which had decided drawbacks. Latterly I have used Lovell's Backed Plates exclusively in my flashlight work. These plates have all the chemical qualities desirable in an extra rapid plate, with the advantage of a thin coating of anti-halation compound at the back, which is again covered with porous black paper. With such a plate one is saved the labor and delay of backing plates every now and again, and at the same time assured that one's plates are always perfectly backed. The backing is easily removable by soaking the plate in water for a moment before development. I would not speak of these plates at such length had I not, as an old photographer, found them peculiarly adapted to flashlight work. For light draperies on people or in rooms I have found them splendid. At the same time I repeat the advice: stick to the plate you know best, only see that it is backed for flashlight use. With films, of course, the necessity for anti-halation backing does not exist.

A Flashlight Developer For developing flashlight exposures I have but one formula—a combination of hydroquinone and eikonogen. We all have our favorite developer, and there may be others as good as mine. But the reader must bear with me if I claim the formula here given as the only one worth talking about. I have used it for all classes of flashlight work and have never found it wanting. It is always perfectly under control. If the plate is underexposed, my developer will keep on working until all that can be gotten out of the plate is gotten out without fog. If the plate is overexposed I can adjust my developer to suit the case in hand to a nicety. My negatives are full of vigor and have excellent printing quality for the platinotype process I use in making my prints. It works equally well (in my hands at least) with all the standard makes of plates, and it does not stain or injure the hands. In brief, it fills all my demands in the way of developers and, although much of this may be contrary to the law and the prophets, I am speaking from experience and must express my opinion frankly or not at all.

The Formula

This developer of mine is a two-solution affair, and of good keeping qualities. I do not, however, advise using it or depending on it after it is three months old. It is made up as follows. *No. 1:* Hydroquinone, 1 ounce; eikonogen, 1 ounce; sulphite of soda, 5 ounces; and boiling water, 90 ounces. *No. 2:* Carbonate of soda, 5 ounces; boiling water, 30 ounces. To mix solution *No. 1*, take a bottle capable of holding 100 ounces, or whatever fraction of 90 ounces it is desired to make up at one time. Measure into the bottle cold water to the amount of solution needed and put a paint line on the bottle to aid you afterwards. Now empty the bottle until it is only one-third full of cold water, and add boiling water, gradually pouring off the chilled water until you have the requisite amount of boiling water in the bottle without mishap. Into the boiling water put first the sulphite and thoroughly dissolve it; add the eikonogen and dissolve it; and lastly add the hydroquinone, shaking well until solution is complete. When the mixture is cool, filter it carefully, and you have a clear, amber-colored solution ready for use. To mix solution *No. 2*, take 30 ounces of warm water (or a proportionate amount) add the carbonate, dissolve thoroughly, and filter when cold. If Seed's "chemical pure" sulphite and carbonate are used take only half the amounts specified above for these two salts. This is important. I cannot too strongly urge the use of these Seed specialties as a big help in rational development.

The methods I use in development will be dealt with when we reach that department of flashlight work. We have now considered all our tools and aids except lamps and powders. These we will take up next, giving them the detailed consideration they deserve.

The Lamp

In flashlight photography, as in other arts, success is finally dependent on the man behind the gun, as popular phrase has it. Apart from the personal factor, it is a debatable question whether the flashlight itself, or the flash-lamp, is the more important item in the flashlight equipment. The flashlight alone, to be sure, makes flashlight photography possible. But the flash lamp so largely controls the ignition and combustion of the powder that, no matter how perfect this may be, whether plain magnesium or "compound," the lamp practically determines the success or failure of every flash. Here we see the importance of the lamp—a point rarely appreciated until emphasized by bitter experience.

The choice of a lamp is not an easy matter. Probably no other field of photographic endeavor is so replete with freak inventions as the flashlight field. We are beset on every side by a countless variety of lamps, priced from one to over seven hundred dollars, and offering every conceivable feature likely to persuade one to buy. What are the absolutely essential features? The lamp must offer a simple but sure means of securing complete combustion of the powder employed; it must be readily adjustable at different levels; and it must not be too bulky or complicated. Beyond these simple essentials "the doctors differ" vastly. For my own part I would add that the lamp should be operated either by alcoholic flame or electrical fuse. Practically we can only see what is said in favor of the various systems in common use, so that we can decide upon the one best adapted to our needs, and then select an equipment to suit the system chosen.

For the "snapshot" amateur, who shies at the mention of serious work, the flash sheets, or flash cartridges ignited with match, taper or fuse, offer the simplest form of lamp. These are extremely convenient, always ready for use without further preparation, and have their advantages. They are lamps which can be used only once, and contain a fixed amount of powder which limits one to a single style of lighting—a decided disadvantage for all-round work. Those cartridges which are fitted with a time fuse, or the gun or pistol lamps which ignite the powder by pressure on a trigger, are perhaps the best among these simple forms. But it would be folly to attempt careful work such as portraits or groups with them. The same applies to all lamps which can be used in the hands only; their usefulness is extremely limited, and success with them so problematical that, for work of the sort to be discussed herein, they are out of the question. The worker with a serious purpose will require his hands and attention for other things than lamp holding or firing, and must be prepared to face the expense and trouble of proper apparatus if his work with flashlight is to approximate that made in daylight. I do not here intend to condemn the small, inexpensive lamps, but simply to point out their incapacity for the work to be considered hereafter. They have their place and use, and give results proportionate in varying degree to the expenditure they involve.

Hand Lamps

Compact hand lamps, fed with alcohol and operated by bulb, lever, or other mechanical device, and which may be used on a stand or other support, comprise a different class and offer a wider usefulness. Properly handled, this form of lamp can be made to do effective work Broadly speaking, all hand lamps fall into two classes, those made for use with magnesium powder, and those made for use with compound or explosive powders. Magnesium lamps are usually known as magazine, closed, storage, or blow-through lamps. In such lamps the magnesium powder is stored or held in a reservoir or container, and, at the moment of ignition, the powder is blown through the flame in a fine spray. Thus a continuous flame of a few seconds' duration, or several separate flashes, may be made with a single charge of powder. It is obvious that an explosive powder could not be stored or handled in this close proximity to flame. Hence the rule: Never use anything but plain magnesium in a magazine or storage lamp. It is important to note this, as disaster will surely follow any attempt to ignite a charge of flashlight compound in a lamp made for use with magnesium only. Lamps made for burning compounds are known as open lamps. In them the powder is free (not confined) and they require charging for each flash. The Prosch Storage lamp is a good example of the lamps intended for magnesium only. The Luxo lamp is an example of the lamps for use with compounds.

Stand Lamps

Stand lamps, or flashlight machines, as they are usually called, are intended for use with compound powders only. Two principal forms may be described. One of these is a metal stand having a series of tubes placed laterally, and separated by 9 or 12 inches. These tubes, which extend 3 or 4 ft. in length, hold several small metal cups or powder containers. A small gas, gasoline or alcoholic flame is provided near each powder cup and, when ready for the flash, a pressure of the bulb releases the powder pans, overturning their contents into the gas flames. The Williams Flashlight machine, with a capacity of 36 or 48 powder cups, is the best known apparatus of this sort. The stand is adjustable so that the arrangement of lights may be placed at an angle of 45°, and when extended the lamp occupies 8 or 10 ft. of space. It was very popular for professional work a few years ago, and is still used in that capacity, but its bulk is against its use for home or amateur work. A similar lamp on the same lines, but smaller and better adapted for amateur work, is the Newcomb lamp. This lamp I can recommend as simple in its operation, and giving very desirable results. It consists of 18 powder pans set on hollow tubes carrying alcohol. Over each flame is a copper wire kept at red heat. This is attached to a bar, which, when automatically released, causes the hot wire to drop on to the pan, thus effecting the ignition of the powder. The result is a flame of

8 ft. square in area, and ample for all ordinary requirements. Lamps of this kind are known as "spread-light" machines, because their arrangement spreads the light over a comparatively large area, approximating the skylight of a studio.

The other sort of stand lamp, and that preferred by the writer, consists of a metal tray or pan mounted on a metal stand of light construction, and adjustable at any height. This tray is usually perforated at intervals and is intended to hold several small charges of powder, or one long train. At the moment of exposure a flame, heated point, or electrical fuse is brought into contact with the powder and ignites it. Because the light is in this way confined within a relatively small area, such machines are known as "bunch light" lamps. They give a direct light of great intensity, which is easily handled. The illustrations herein are examples of the work of a "bunch light" lamp in capable hands.

The reader will perceive in all this that the chief desideratum in a flashlight machine is to secure the ignition of the powder or compound while it is in the air, and not partial combustion and partial explosion. Any device which permits the powder to "cake" or "crust" after ignition is not giving perfect combustion, and the resulting waste of powder means loss of light as well. This should have weight in choosing a flash lamp.

Flashlight Powders

The choice of a flashlight powder is an easier problem than the lamp. Wherever possible, the worker should provide himself with two lamps, one for burning magnesium only, the other for use with "compounds," so that he may use that best adapted for his purpose.

Magnesium

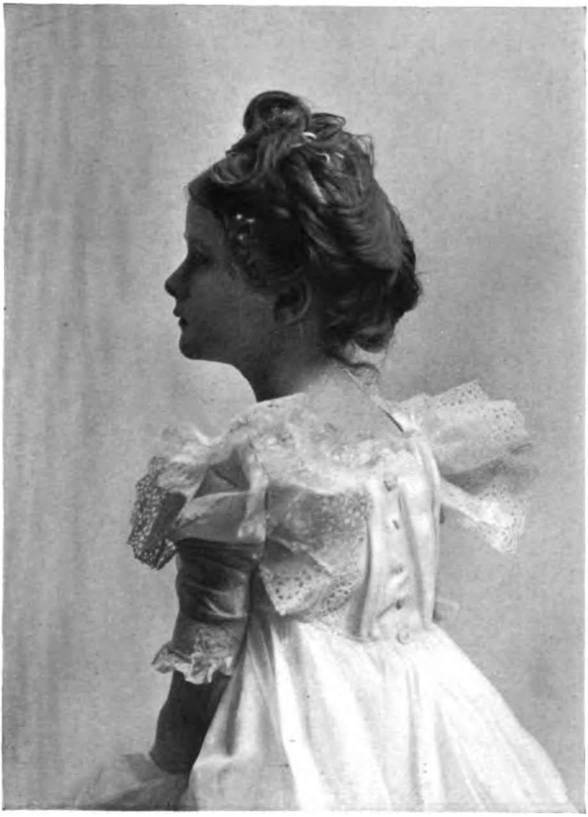
For interiors and inanimate subjects generally, or wherever a prolonged exposure of from five to ten seconds is possible, or where it is desirable to illuminate several sections of a room by repeated flashes from different positions, or where there are high ceilings and abundant ventilation, pure magnesium powder is the safest and best illuminant. Half an ounce of magnesium powder will amply illuminate a room 50 ft. square. The advantages of magnesium are its cheapness, safety in manipulation, latitude in exposure and reliability under all ordinary conditions. Its disadvantages are its limited power as an instantaneous illuminant, and the great amount of smoke and dust resulting from its combustion, which unfits it for use in small rooms or confined spaces.

Compounds

For general flashlight work, portraiture, groups and other instantaneous work, the best results are only possible with a flashlight compound. The most popular brands are Luxo, S & M, Sunlight, Ideal and Eastman's powders. Of these Luxo and S & M are undoubtedly the most largely used. The choice of a powder is altogether a matter of personal fancy in dealing with the best. Mr. Waters, who will hereafter describe his method of using the bunch light system, prefers S & M because of its intense illuminating power, minimum of smoke or odor, and its free combustion, which gives practically no vibration or report after ignition. Mr. Guerin, of St. Louis, prefers Luxo. Other workers speak with equal enthusiasm of the virtues of Eastman's powders, the Ideal, the Sunlight, and others. Hence every one must choose for himself, and go by his own experience.

Danger

In the handling of any flashlight compound, good, bad or indifferent, there is always more or less danger. They are all explosive mixtures and must be handled with care and intelligence from the opening of the vial or container to the proper ignition of the flash. Friction, such as the rotary motion often used in opening a bottle or carton, should especially be avoided. The container should be held at arm's length, away from the eyes, and the cork or lid gently eased off with the point of a knife. In charging a lamp keep the flame away from the powder in every case, and do not get any nearer to the lamp than is necessary, placing the powder in its cup or pan with a spoon or measuring cup instead of pouring it direct from the bottle. There is no desire here to raise undue alarm in the reader, but it is very necessary to emphasize the need of care. Many de-



FLASHLIGHT PORTRAIT. No. 4
E. D. Waters

FLASHLIGHT GROUP. No. 5
E. D. Waters

plorable accidents have happened in the preparation and use of flash powders, but almost invariably these have been caused by carelessness or lack of thought on the part of those concerned. An ounce of prevention is worth a pound of cure.

All powder should be kept as dry as possible before use. Certain of the ingredients commonly used absorb moisture very readily. This causes the formation of little lumps or balls which, when the charge is ignited, fall within a circle at some distance from the lamp, sometimes giving a long curved line of light in the negative. When powder is seen to be full of these little balls, it should be poured out on a sheet of paper in small lots, and gently rubbed smooth with the ball of the thumb.

Charging the Lamp

The action of the various powders varies somewhat in light-distributing power. The amount of smoke given off in combustion has much to do with this. In charging a "bunch light" lamp, the best results in portraiture, groups, etc., are obtained by spreading the powder in a line or train not longer than six inches or even less. If placed in a pile much of the light will be lost, owing to the amount of smoke following the ignition of powder in this form, the rush of air following the flame making a screen with the smoke. In making pictures of fairly large interiors the powder should be placed in as long a train as the powder pan or tray will permit. In charging any lamp, however, it is well to be governed by the instructions accompanying the lamp, but beware of being misled by any information to the effect that the powder is "harmless." It is not possible to give any definite instruction as to the amount of powder to be used, this depending on the powder, the subject, and other factors.

Practical Work

We have now covered the general consideration of flashlight work and apparatus, and will take up a practical system of working. The system here described is that employed by Mr. E. D. Waters in the making of our illustrations. As far as possible I will quote Mr. Waters, on whose notebooks I have drawn heavily for much of the information already given. It is possible that in his description Mr. Waters will repeat some things already mentioned, but the reader will bear with this, as tending to greater clearness and a better understanding of manipulation.

Thayer's Lamp

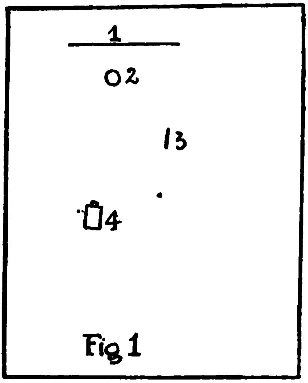
The lamp used by Mr. Waters is a "bunch light" or single tray lamp made by Thayer, of Chicago, and operated by an electrical fuse in place of alcoholic flame. I regret my inability to give a diagram showing its construction. Mr. Waters says: "Of the lamps operated by electricity I have found the Thayer instrument gives me most satisfaction. It occupies very little space in its case or when set up. It is worked by means of a small storage battery which can be used four or five hundred times before needing to be recharged. The latter is quite small and can be carried in the pocket. Briefly described, the lamp is a single pan affair set upon a tripod much like the ordinary music stand. At the top is the powder pan, about two feet in length. In the centre of the pan are two little catches holding a metal fuse which is burnt when the electrical connection is made. The flash-powder is laid over this fuse so that when the button is pressed from the end of the tube, the powder is instantly and completely ignited. The lamp has two adjustable arms which may be used to support pieces of cheese cloth in front of and behind the flame when diffusion of the light is desirable. This instrument, which costs $25, I consider the best of the larger lamps. There is a lamp introduced by Gennert, of New York, which is almost identical with the Thayer lamp except that it works by means of an alcohol flame instead of electrical fuse. While I have not used it, I see no reason why just as satisfactory results cannot be obtained with it. The price of this lamp is only $8, which certainly recommends it from the financial point of view. Of the smaller hand affairs I can say but little. Any one that can be set upon a step-ladder and operated by either bulb or time fuse will prove satisfactory. I have never been able to secure good pictures where I had to stand by my flash lamp to manipulate it. The scratching of a match will attract the attention of the sitters practically always, the result being either a change of pose—the eyes being turned in your direction, or a strange staring expression in the picture. Much, very much, of our success in flashlight work depends upon the illuminating medium. The main requisite of our powder is its rapidity of explosion, its actinic power, that it gives off a minimum amount of smoke and residue, that the nature of its explosions are such as to give as little vibration as possible. Flashlight work has assumed such an important place in photography that many manufacturers have produced powders which overcome the above objection, but there still remain a few producers who have neglected these points. I am glad to say, however, that reputable dealers do not push their goods.

A Bust Portrait

In explaining how I proceed in making flashlight pictures I shall take up first the simplest form of lighting for a bust portrait, which shall have pleasing gradations of light which show character and expression to good advantage. I consider portrait No. 1 a good example of this style of handling. This portrait was made in the dining-room at my home, a room 12 ft. wide by 18 ft. long, the ceiling being 10 ft. high. The walls are colored in blue and white—a Delft effect. I used for my background an ordinary shaded ground 5 x 5 ft. square, which was thrown over the door leading to the kitchen. The subject was seated in front of the ground about 3 ft. away, the shoulders being turned to the right, the face about one-third in the same direction, eyes looking directly at the camera. The lamp was placed to the left 4 ft. from and 3 ft. in front of the subject, the pan holding the powder being elevated about 3½ ft. above the head. I used about one-sixth of an ounce bottle of S & M powder. The work was done in the evening about nine o'clock. For use in focusing two gas burners were lighted and turned up to their fullest capacity during all the operations.

In making flashlights by night never turn down the gas when about to make the flash exposure. There is no necessity of so doing, as it has not sufficient power to do any harm during the short period elapsing between drawing the slide and making the exposure. On the other hand if the light is turned down you are practically sure of getting a staring effect. As a general thing darkness causes the pupils of the subject's eyes to enlarge, which spoils the expression and makes the portrait valueless.

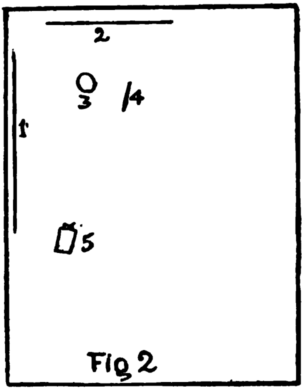
Owing to the light coloring of the walls a reflector was not necessary, as sufficient reflected light was secured without its use. This will serve as a good pointer where circumstances prevent the use of a reflector. Place your subject so that the wall to be used as a reflector will be about 5 ft. away from the subject. In making this style of picture pleasing effects can usually be obtained without the aid of a regular reflector, if the walls are so colored as to give some reflection. If the windows are hung with white curtains use them in the capacity of a reflector. This lighting is very simple, and if the reader is a beginner in flashlight work I strongly advise a few trials of this lighting. Figure 1 will show perhaps more clearly the relative position of subject, camera, and lamp.



1, background; 2, subject; 3, lamp; 4, camera.

The expression of the face is animated and full of interest. There is a lack of flashlightness, and I doubt if many could tell that it was so taken. The Dallmeyer No. 8 lens, working at full opening, was used in making this, with an ordinary Low shutter and its bulb and tube attachment. I stood midway between the camera and lamp, holding the bulb in my left hand and contact button in my right. I exposed the plate and pressed the button for the flash as nearly together as possible, but giving the camera shutter a slight advantage as to first pressure, of course.

The Frontispiece The portrait used as frontispiece was made in much the same way as that just described, with the exception of the following changes. The background was plain black felt, the subject being placed 4 ft. in front of it. The lamp was placed 3 ft. to the right, and about 1 ft. in front of the subject, and elevated 3 ft. above the head. I used about a heaping teaspoonful of powder. The reflector used in making this exposure was arranged as follows: My background was hung about 2 ft. from the wall to the left of the subject, and on this wall was hung the reflector. The Dallmeyer No. 8 was, in this case, stopped down to *f*/11, and the exposure was made on an 8 x 10 Lovell Backed Plate. Fig. 2 will show the arrangement.

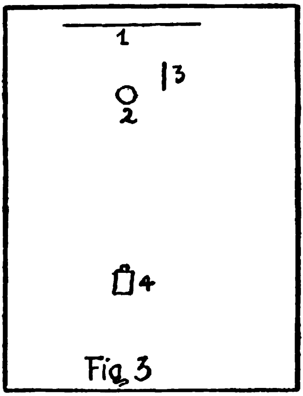


1, reflector; 2, background; 3, subject; 4, lamp; 5, camera.

This portrait was made in the evening of the child's birthday, the costume being a new creation for the coming summer's conquests. The smile was for those conquests likely to occur at any moment. The method of exposure was the same as in No, 1, save that I stood directly behind the camera, addressing the young lady along lines which seemed best suited to bring out the charming smile I caught.

Illustration No. 3 In portrait No. 3 I attempted to secure something having the so-called Rembrandt effect. To get this lighting, proceed as follows: The background may be the same as used in making portrait No. 1, the subject being placed about 4 ft. in front of the ground, shoulders turned one-third toward the left, the head being almost full profile in the same direction. The lamp was placed 4 ft. to the left and about 1 ft. behind the subject.

I used a piece of cheese cloth between the subject and lamp, and burned about one even teaspoonful of powder. The lamp was elevated about 2½ ft. above the head of the subject. A glance at Fig. 3 will be of assistance.



1, background; 2, subject; 3, lamp; 4, camera.

No reflector was used in making this picture, and the lens was stopped down to *f*/16. In making a portrait of this kind, where the subject is so nearly facing the lamp, of course it is absolutely necessary not to intimate when the exposure is to take place. This I did by keeping up a conversation on the difficulties of focusing a position of this sort and requesting the lady to be as quiet as possible. By so doing I got interested repose in the expression, which goes far towards making the general result pleasing. This particular portrait has been questioned many times as to its being a genuine flashlight. It was taken about 10 P. M., as described.

Shadow Lighting

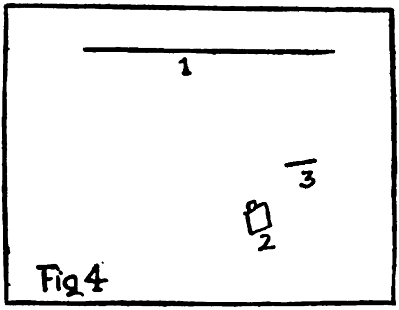
Portrait No. 4 is an example of shadow lighting, showing the face in shadow. Many pretty things are obtained by this method of lighting, a good profile, of course, being necessary. By using the white ground a fair silhouette effect is obtained, which to some people is very attractive. To obtain this result I used my white cloth as a background, doing away with the reflector entirely. The subject was placed close to the background, with the back turned about one-third forward. The lamp was placed to the right 3 ft, on a line with the subject, and elevated quite 4 ft. above the head. No diffusing screen was used between the face and the lamp. About one and one-half teaspoonsful of powder was sufficient for the light. The lens was my $2 Darlot, stopped down to what would equal *f*/6 with an ordinary portrait lens.

Large Groups

Picture No. 5 I consider a good all-around illustration of a large group. I have made negatives of larger gatherings, but always under circumstances when I had far better control of my subjects than upon this occasion. The making of it was entirely unexpected, both by myself and the people concerned, until about ten minutes before the exposure. Perhaps this is why it was such a success from my viewpoint at least. The group represents a "Methodist Deestrict School" giving their closing exercises, the affair being burlesqued by adults, many of whom had doubtless taken part in the real thing as it used to be in earlier days. The entertainment was given in a Sunday school chapel. I was one of the audience, and it was not until after the entertainment had closed that the suggestion was made that I "flash" the group. The idea struck me favorably, so off I went for my outfit, a friend promising to remain and hold them until my return. Upon my return the majority were in open revolt at my twenty minutes' delay, and it was with the greatest difficulty that I got them to pose. I did not attempt any arrangement of the figures, but contented myself with getting them before my camera and made the exposure.

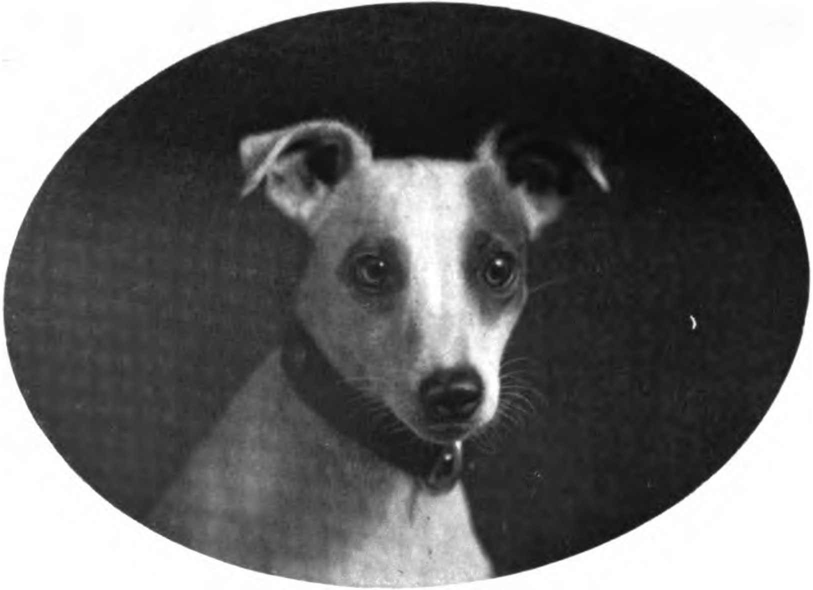
This picture, aside from showing what can be done with groups with the aid of flashlight, also presents a great variety of lighting of individual heads—from the full lighted face down to the Rembrandt effect. The hall in which this group was made is about 40 ft. wide by 50 ft. long, and about 20 ft. high. The group was arranged on a slightly raised platform. In making the negative I used a Seed 26x plate backed with lampblack and alcohol, my Dallmeyer No. 8, the Thayer electric lamp, and about three-quarters of an ounce of S & M powder. The lens was stopped down to *f*/32 in order to get plenty of detail. The camera and lamp were placed according to the following diagram (Fig. 4) the lamp being raised about fifteen feet from the floor. Behind the powder pan I had a white cloth to act as a reflector.

It will be noticed that the lamp is in advance of the camera. This is done in order to have the lamp as near to the subject as possible, thereby getting greater power from the flame and to throw the shadows as straight down as possible—otherwise those behind would be lost in the shadows of those in front. And again, better roundness is obtained on the individual face when the light is so placed. This is on the principle of studio lighting. At an elevation of fifteen feet, and eight feet in front at the camera, the lamp was entirely out of the radius of the lens. There was a large number of gas jets and electric light bulbs burning in the room at the time of exposure, some of which appear in the picture. Here, too, is shown one good result of the backed plate, as also in the detail of the white costumes and faces, many of which were made up with grease paints. It will be observed that all eyes are open, looking straight at the camera (with one or two exceptions), and that there is an entire absence of that staring expression so often found in flashlight groups. The walls of the room were terra cotta in color, consequently I got practically no assistance from them as reflectors.

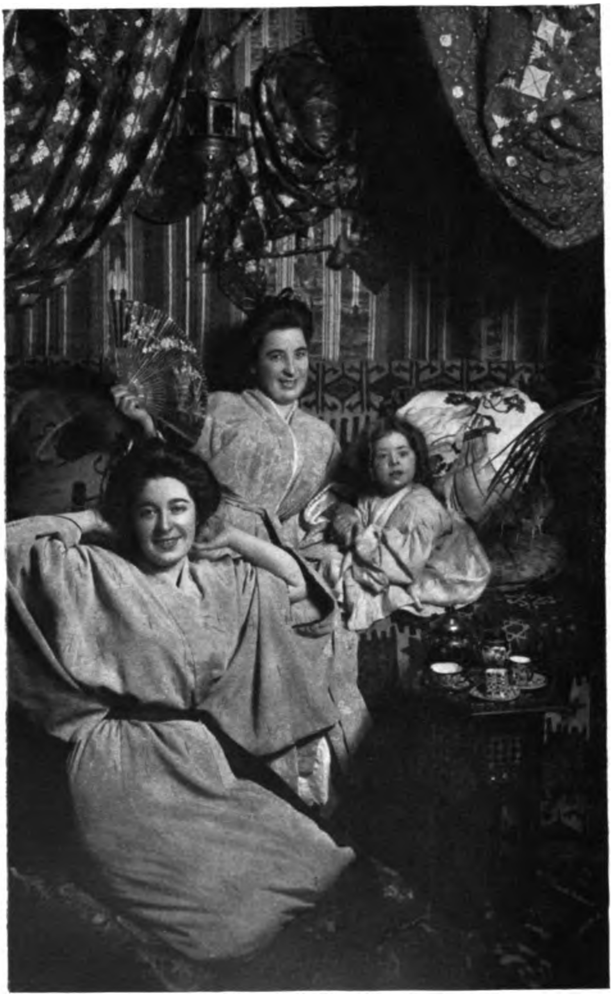


1. group; 2, camera; 3. lamp.

Domestic Animals The successful photographing of animals under any circumstances presents sufficient difficulties to make it almost impossible to obtain anything really satisfactory. It is here that the use of the flashlight stands out as pre-eminently the proper method. To photograph an animal by daylight, getting the exact gradations of light and shade which will properly portray its character and coloring, to stop your lens down sufficiently to



FLASHLIGHT PORTRAIT. No. 6
E. D. Waters



FLASHLIGHT GROUP. No. 7
E. D. Waters

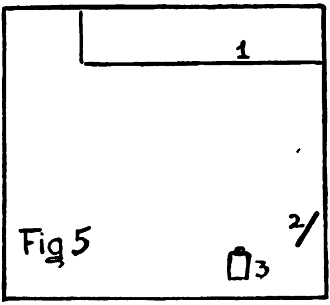
cover it all over and at the same time make an instantaneous exposure, presents about as choice a lot of uncertainties as I can imagine. Photographing a wiggly baby is a mere pastime compared with it. It is true that, by getting your animal into the glaring sunlight, exposure is comparatively easy, but where are the lights that will show the life of the animal, the fineness of its hair, the life of the eye? Others may get these results by daylight, but I never could. I have made pictures of all the domestic animals by flashlight with results infinitely better than anything I have seen by daylight. Picture No. 6 shows the likeness of a fox terrier, which is acknowledged to be one of the most active animals of the domestic group. This was made identically as I would have made the portrait of a person, except that I stopped my lens down to *f*/32 and used half the amount of powder, placing the lamp about 3 ft. to the right, 1 ft. in front of the subject, and about 3 ft. above. I spread my powder over about 2 inches to shorten the exposure as much as possible. The development of the resulting negative I will explain later.

Small Groups at Home

Illustration No. 7 is a fair sample of a small group. This was made in exceedingly cramped quarters, the smallness of the room necessitating the use of a wide-angle lens. The subjects represent three generations, grandmother, mother and granddaughter. The look of interest on the child's face was caused by my assurance that there was a kitten in the box (camera) which would shortly appear. The pose of each figure is easy and free from stiffness. The little girl was talking at the moment of exposure while the ladies and the photographer were laughing.

The exposure was made as follows: the camera was placed directly in front and about 10 ft. away from the group, while the lamp was set on a line with the camera, and about 3 ft. to the right of it. The powder pan was elevated about 2 ft. above the head of the person in the group farthest away from the camera. The lens was stopped down to *f*/32, the amount of powder used was one teaspoonful. This picture illustrates about the limit of proximity of lamp and camera. Even in this case if the lamp had not been raised as high as it was, the result would have been poorly lighted eyes as well as a generally flat appearance of the faces. The dimensions of the room were about 10 x 12 feet. Fig. 5 shows the relative positions of lamp, camera and group. No reflector was used.

In the illustrations given thus far I have attempted only the simpler styles of work, going on the assumption that those who read this little book will desire to begin at the beginning and work to the more complicated lightings — after they have mastered the simpler forms. More elaborate effects will naturally be evolved as the reader becomes genuinely interested in the work. Flashlight photography, like any other branch of camera craft, will be stamped almost immediately with the operator's individuality, therefore, as I say, I leave the intricate and more advanced ideas for him to work out after he has tried the simple suggestions I have herein offered.



1, Turkish corner containing subjects: 2, lamp; 3, camera.

Try some of the lightings herein shown, and let each one contain some education to higher and more artistic results. It will astonish even the beginner to note how quickly he can master this seemingly elusive light, and have at his command a power as large in its proportions as daylight. I have no hesitancy in saying that, within its proper field, it has all the possibilities and latitude of the sun's rays.

Bold Lighting Effects In illustration No. 8, a costume picture of a young Spanish lady, is given an example of extreme contrast. Pictures of this kind offer a great latitude for showing odd effects. The portrait was made by placing the lamp about 2 ft. to the side and about 6 inches in front of the subject, the fire-pan being elevated 2½ ft. above the head. The reflector used was placed *behind* the lamp in order that the light should be concentrated as much as possible. Window curtains of red velvet answered for the background. In developing the plate I used a rather strong solution, adding only 1½ ounces of water to the normal developer, together with 2 drops of a 10 per cent solution of potassium bromide.

Photographing a Baby

Illustration No. 9 shows what can be done with a baby by flashlight. The young man is a wriggler in every sense of the word, and I doubt if any skylight would have been fast enough to catch him as I have done here. The arrangement of lamp, background, etc., was as follows. The group was placed 4 ft. in front of the background. The reflector was equally distant from them to the right, while the lamp was 5 ft. to the left and 3 ft. in front. A screen of cheese cloth was hung in front of the flame to soften the light. The lens was stopped down to *f*/32.

Suggestions

In the foregoing illustrations I have shown the simpler forms of using the flash lamp, but its scope is by no means limited by what is here shown. For the benefit of those who are inclined to go further, the following suggestions taken from my notebook may be useful. They smatter largely of the freakish, but are effective in their way. Some are old in their composition, I know, while others I think will be found different.

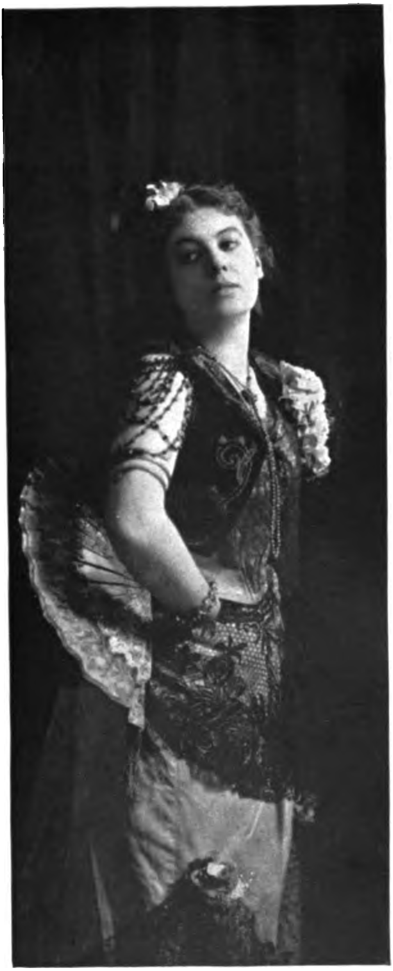
Silhouettes

The old fashioned silhouette has many fascinating qualities. To make pictures of this kind tack a sheet over a door between two rooms, place the subject in front of it—about 10 ft. away. Get an assistant behind the sheet to light a match and hold it directly behind the subject in order to focus the outlines of the sitter's face. Then place the powder, which should be a single pile, so that it is directly behind the subject, about 5 ft. away from the sheet. Only a small quantity of powder is necessary. Open the lens and ignite the powder. It is best to overdevelop negatives of this kind. The first few trials in making flashlight silhouettes may not prove satisfactory, but in a short time one can get very pleasing results.

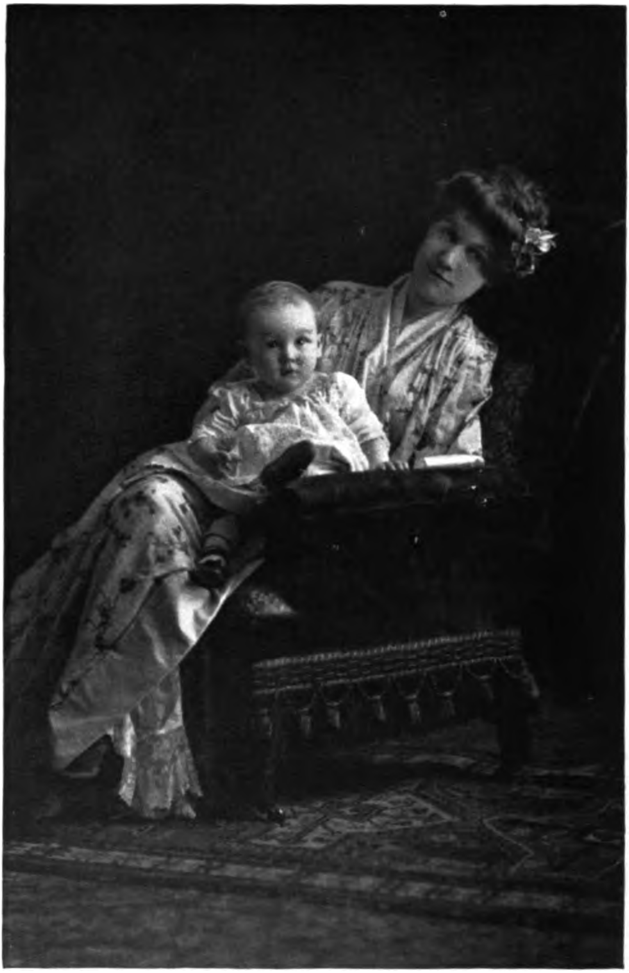
An Odd Effect Another interesting experiment along this line is to use an old sheet, as just described, save that directly behind the subject's head a round hole about 2 or 3 inches in diameter is cut. Place the lamp directly behind this opening and ignite about 10 grains of powder. Profiles of children made after this manner are sometimes very pleasing. By moving the subject different distances from the opening the halo can be reduced or intensified in its definition. A black ground may be substituted for the sheet if desired, with equally good results. A large piece of black cardboard will answer the purpose. In using black ground make the opening about half the size as when using white.

Figures in Doorways Pose the subject beside a door which is slightly ajar,—say one to four inches. Light the powder in the next room so that its light will fall on the subject, and odd but artistic effects may be secured. The light should be placed as high as possible so long as the rays are not screened from the subject by the top of the door frame. Again using this principle proceed as in making illustration No. 1, but in place of letting the full light fall on the sitter, use a large piece of cardboard in which a hole has been cut about 5 inches in diameter. Place this directly in the line of the powder and the sitter's face. The result will be a very contrasty negative, which should be developed in slightly diluted developer (about half water and half developer) with a few drops of a 10 per cent solution of potassium bromide.

Fireside Pictures The fireplace lends itself to many interesting effects by placing a small group about it in unconscious arrangement. An ordinary cartridge placed in the grate will supply the light. Care should be used to have some one directly between the lens and flame to prevent the burning of the powder being shown in the picture.



FLASHLIGHT PORTRAIT. No. 8
E. D. Waters



FLASHLIGHT GROUP. No. 9
E. D. Waters

Window Pictures from Outside By posing a figure before the window on the first floor, looking out at an angle, and using a good charge of powder, ignited outside at a height of 5 or 6 ft. above the head (well to the side of the subject and about 5 ft. distance from the window) a novel and charming effect may be secured. The light must be far enough to the side so that the wall of the house will be between it and the camera, and the subject should show the profile, not the full face.

All these little dodges will give very pleasing results and are extremely simple in their making, the only caution needed being to use judgment in keeping the direct rays of the flash flame out of the radius of the lens.

My Powder Measure In giving the quantities of powder that I use I have made the lowly teaspoon my scale. It is usual to denote the amount of compound required in grains. My idea of a spoonful is about 50 to 60 grains, but I find it very advantageous to use the spoon on account of its always being more convenient than the scale; and again, the handle lends additional distance, which is very useful in all cases. Before many exposures are made its usefulness as a scale will disappear—your judgment and knowledge of the powder and its power will succeed it. As a valuable assistant in placing the illuminant where required its usefulness will be apparent.

Development In considering our tools I gave the formula for my flashlight developer, so that it might be ready for use when required. We can now profitably take up the development of flashlight negatives, which I believe is fully as important as any other detail of the work if not, indeed, more important.

Owing to the necessarily slow development of plates exposed by flashlight let me caution the reader to be doubly sure of his dark-room light. How many good exposures are ruined by insufficient attention to this detail! Of course we all know what is required of a lamp: a light so filtered by a medium (generally red glass), placed between the point of illumination and the plate, as to render the handling of the sensitive film safe during its development. For my lamp I use three thicknesses of Dennison's orange tissue No. 69, placed between pieces of plain and ground glass. I find this light as safe as any of the more elaborate and expensive combinations. My lamp was fitted with this combination two years ago and there seems to have been no material chemical change in the paper as yet.

Next in importance I consider cleanliness the greatest factor in the dark room. Clean trays, clean floor, clean sink, clean hands. If you are in the habit of removing negatives from the hypo bath and flourishing them about look out for the results. The drops of saturated solution fall about on the floor, and after the water has evaporated the crystallized hypo is sure to get into circulation in the air, and will fall where it will harm. Abstain from putting your hands in the hypo while developing. Washing may seem to remove it, but it does not. Have a fixing box of sufficient capacity to hold all your negatives until development is finished, and not until it is finished and all things pertaining to it are put away, let the hypo be touched. Remove the fixed plates directly to the washing box, bottle your curiosity for an hour and let the negatives be well fixed and well washed before you handle them. Experience will bear me out in this, though the caution may seem extreme.

An Example

For our first lesson in developing let us take the negative used in making Illustration No. 1. The developer used was according to the formulæ given on an earlier page. The normal proportions of this developer are 3 ounces of No. 1 to 1 ounce of No. 2. In developing the negative mentioned I mixed 3 ounces of No. 1, 1 ounce of No. 2, and added 3 ounces of distilled water. The development was completed in about 8 minutes.

Illustration No. 2, on account of the great mass of white, was developed in a much weaker solution in order to control the detail, 5 ounces of water being added to the normal developer. When developing a negative of white drapery the details can be retained by occasionally removing the negative from the developer and, with a tuft of cotton saturated with a 10 per cent solution of potassium bromide, wiping over the parts inclined to gain density too quickly. To do this, remove the plate, rinse it under the tap, and, holding it flat, go over the part desired with the bromide, being careful not to let the bromide spread. After this, again rinse the plate *thoroughly* and return it to the developer. By repeating the operation two or three times the full value of the drapery is retained. This restraining method comes in very handy with any class of negatives inclined to be contrasty. The first treatment should be given when the image first begins to appear, the later treatment being governed by the appearance of the negatives. This method will be found much more convenient than locally reducing a negative after development. The development of a negative of this kind will occupy about 20 minutes.

Illustration No. 3 was developed by the addition of 2 ounces of water to the normal developer, and by using the bromide method just spoken of on the dress. About 10 minutes was required to complete the development.

Illustration No. 4, was developed with the addition of 4 ounces of water to the normal developer. I treated the white drapery to two applications of the bromide solution. The time of development was about 20 minutes.

Illustration No. 5, I felt, would prove badly undertimed, owing to the size of the room and poor reflecting power of the walls. To 3 ounces of No. 1 and 1 ounce of No. 2, I added 10 ounces of water and 4 drops of 10 per cent solution potassium bromide. I kept the plate in this solution for 35 minutes, then changed my developer, making it as follows: 3 ounces No. 1, 1 ounce of No. 2, and 6 ounces of water. In changing the developer, I washed the plate thoroughly under the tap to remove all the old developer. After working in the developer for 10 minutes my plate was sufficiently dense and ready for the hypo.

In developing exposures of animals I consider the best results are gotten by starting off with a weak developer and strengthening it as the detail comes out. Illustration No. 6 was developed by adding to one-half the normal developer an equal amount of water (2 ounces), and when a fair amount of detail was secured, I added the balance of the normal developer. In the diluted solution I put three drops of 10 per cent solution of potassium bromide.

In developing the negative of illustration No. 9, I used equal amounts of water and normal developer without the aid of bromide. It took about 10 minutes to complete development, with the result of a very soft negative, full of detail and atmosphere.

One thing noticeable in fixing negatives made by flashlight is that it is better to carry the negatives a little further in developing than is usually necessary for daylight exposures.

Backgrounds: Accessories

A word of explanation as to how my background and reflectors are put together may be of service. Both these accessories are 6 feet wide by 12 feet long, and are attached to a light curtain pole 6 feet long. At each end I have an ordinary screw to which is attached a piece of picture cord long enough to permit the pole to be about 6 inches from the picture moulding when it is in position. To this wire I have fastened a picture hook. In putting them up I use the wall determining the length of the room for the background, and the one at right angles to it for the white sheet or reflector. Of course the background is not an absolute necessity in portraiture, as one can use the surroundings equally as well for that purpose. To my mind, however, a portrait should be constructed as simply as possible, both as to accessories and to pose of subject. Many times what would otherwise be an effective picture is ruined by the conglomeration of furniture and bric-a-brac which will generally have a number of reflecting surfaces, giving white spaces which will attract the eye first of all. True, many times a door, screen, piano, window or desk lend a rather striking effectiveness to the portrait, but don't try to run them all in at once—this applies particularly to single figures.

Placing the Camera

In making portraits of single figures or small groups care should be used in placing the camera that it is not too high. This is an error indulged in by amateurs and professionals alike. The lens should be about on a level with the chin of the subject, pointing slightly downward, the back of the camera being raised about 2 inches. This permits of greater latitude in the placing of the lamp, besides giving far more pleasing results in the finished picture.

Handling the Sitter

In making flashlight portraits much depends upon the capability of the one making the picture being able to keep up the conversation during the time of preparing the camera and lamp. Acquaintance with one's subjects should make this easy. If they are interested particularly in the work itself use this interest as the topic of conversation while preparing for the exposure. If they are not interested in photography seek some other topic of interest to them. With the children this will not be difficult. With the ladies a little flattery goes far towards satisfactory results. Dwell on some detail of their costumes. As far as possible let the trend of your conversation and remarks be in keeping with the expression you wish to obtain. In making exposures of men this rule applies, except that I do not advise remarks as to their dress.

In making pictures of groups, particularly large groups, do your preparing regardless of the remarks that always accompany the proceeding. Use all the dignity at your command during the operation, and trust to a certain amount of it being absorbed when you are ready for the exposures—slide drawn and lamp ready—slip away from the camera as far as the shutter tubing will permit and after a few words of banter if it is necessary, explain as shortly as possible that half the success of the work depends upon them, that they remain as quiet as possible; explain partially how you intend making the exposure and, when you have led them up to the point of explaining how you press the bulb, press it and make the exposure. Never let your subject know just when you are going to expose. This is my general rule but, of course, it never works twice alike. I consider these details of flashlight work just as important as the adjustment of the lamp and camera, and I trust that those who propose to try my methods will make this a study.

In the finishing of flashlight portraits I strongly advise the reader to make use of a little retouching and smoothing up the lights and shadows, removing what facial blemishes there may be—freckles, etc. With some practice one can easily learn to do this for oneself. It is extremely interesting work and is a great aid in overcoming the defects which many times ruin a good picture. A careful reading of THE PHOTO-MINIATURE No. 12: *Retouching Negatives and Prints* will supply all the information needed, and a little practice on an old negative or two will give sufficient skill to do what is required for best results.

Care of the Lamp

The care of the flash lamp is more or less important, keeping it clean and free from incrustation. A stiff fibre brush passed over the pan after each exposure will do the work. There is always a slight residue remaining, which should be removed before a fresh charge of powder is placed on the pan. If the lamp is of the electric sort, the battery will need a little attention. Keep the solution fresh,—the poles must be free from corrosion. It is well to test the battery now and again by touching the poles with a bit of clean copper wire before using. If it is properly charged, sparks will appear. If alcohol is needed, see that the pure article is used,—never use the varieties known as "wood alcohol," or "methylated spirit," as they contain a large percentage of water and are somewhat dangerous.

Conclusion

It now remains only to draw our discussion to an end. I have not dealt with interior photography by flashlight because this has already been covered in an earlier number of THE PHOTO-MINIATURE, and is a much simpler field than portraiture. At a later day we may again take up flashlight work, including interior photography, and the use of other systems than have been outlined herein, together with some special uses of flashlight. My thanks are given to Mr. Waters for his valuable help in the preparation of this monograph, as well as to others whose information reached me too late to be of service in these pages.

BOOKS

Portraits in Photography by the Aid of Flashlight. By F. W. Guerin. 1898. 50 pp. This work consists almost wholly of half-tone illustrations, with an explanation underneath giving the details of production. It is a very useful book for the flashlight worker, although intended chiefly for the use of professional photographers. Cloth. $1.50.

Flashlight Photography. By Robert Slingsby. With 4 illustrations. A description of the author's methods. (English) 1893. $2.

NOTES

The annual conventions of the Photographers' Association have separately but invariably gone down into history as the most successful in the annals of the association, and the meeting held at Detroit, August 6 to 9, was not an exception to this excellent rule. Over 800 photographers paid their dues in person, and the total number in attendance was hardly less than 1,000. The proceedings were very much as usual, i. e.: morning sessions full of business and the reading of papers; afternoon sessions devoted to illustrated lectures or demonstrations, a variety of entertainments, and a personally conducted tour around the local art museum. A verbatim report of meetings and papers may be seen in the September number of *Wilson's Photographic Magazine.*

An unusual amount of interest attached to the convention this year because it was to prove the success or failure of a radical change of policy, to wit: the abolition of all prize or medal giving at the exhibition, which forms a conspicuous feature of the convention. All class restrictions and competitive conditions were swept aside, and the work shown was selected for its merit only. The innovation proved wholly successful, the pictures displayed were of a higher order than at previous conventions, and it seems unlikely that medals or prize awards will ever again appear in the association's announcements. Only those familiar with the keen rivalry which distinguished the competitive exhibitions of past conventions can appreciate the significance of this reform. Its outcome is very much to the credit of American photographers.

Mr. E. B. Core presided at the meetings and was ably supported by the local committee, to whose enterprise and care much of the success of the affair was due. A notable feature of the convention was the

ANTI-TRUST

PURE COLLODION PAPERS

MONARCH MATTE

MONARCH

TRADE MARK

MONARCH GLACE

**RELIABLE
UNIFORM
PERMANENT**

Three times quicker printing than any other

Prices same as other Collodion Papers

MANUFACTURED ONLY BY THE

MONARCH PAPER COMPANY

E. & H. T. ANTHONY & CO.
SOLE TRADE AGENTS
122-124 Fifth Avenue : NEW YORK

ANTI-TRUST

presence of an unusually large number of prominent members of the profession, among whom may be mentioned Mr. Pirie MacDonald, Mr. Will Armstrong, Mr. Morris B. Parkinson, Mr. W. M. Hollinger, Mr. F. G. Schumacher, Mr. Fitz Guerin, Mr. J. F. Ryder, Mr. W. H. Potter. The trade interests were well represented, but the dealers complained that the educational and social features of the convention left little or no time for business. Altogether the affair may be said to have been most enjoyable and more than usually profitable. Mr. George Edmondson, of Cleveland, Ohio, was elected president for the ensuing year, and Buffalo, N. Y., was chosen as the location for the convention of 1902

❧

Very dainty, and as useful as it is dainty, is the new form of the Wager Exposure Scale, put out by the Wager Exposure Scale Company, Box 539, Philadelphia. This new form is an effective combination of aluminum and celluloid, on which the data showing exposures under varying conditions shows very clearly and plainly. The Wager scale measures 3⅛ x 5¾ inches and is easily carried in the pocket. It is a practical helper and we have used it with increasing satisfaction for a year or more. As a means of quickly ascertaining exposures we can recommend it as preferable to any meter requiring the use of sensitized paper. The manufacturers publish a little book about their meter which is well worth having. It will be sent only to those who mention this notice.

❧

The interest in Ozotype continues to increase here and in England. In the *Amateur Photographer* of July 27, may be found an article on "Gum Ozotype," which will repay perusal. We note that Kirk Geary & Co., San Francisco, have put in a stock of Ozotype supplies, so that western readers may obtain the necessary materials in their own locality. The eastern agent, Mr. George Murphy, New York, has on view a few specimens of the process, which may be seen at his store, 57 East 9th street.

CRAMER'S
Isochromatic
Plates

ARE THE MOST PERFECT COLOR-SENSITIVE PLATES ON THE MARKET

◆

Made in Three Grades of Speed:

SLOW, MEDIUM and
INSTANTANEOUS

◆

For Sale by all Dealers in Photographic Supplies

◆

Manufactured by

G. Cramer Dry Plate Co.

ST. LOUIS, MO.

OFFICES IN

NEW YORK, No. 32 East 10th Street
CHICAGO, Room 705, Cable Building
SAN FRANCISCO, Room 38, No. 819 Market Street

Use Mallinckrodt's Sodium Sulphite Anhydrous
Absolutely Pure for Photographic Purposes

A few weeks ago we received a query from an Indian friend asking for a reliable method of restoring faded gelatine chloride prints. Not being able to lay hands on such a method, we queried half a dozen experts. Somewhat to our surprise we were informed that the thing was practically impossible, Valenta's process for restoring faded albumen prints being the method most likely to offer results—about which all the experts expressed considerable doubt.

◆

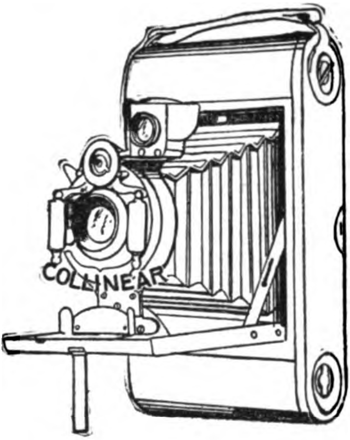
Some Developing Hints.—Messrs. Cadett & Neal, makers of the well-known Cadett plates, have issued a leaflet giving some very seasonable advice about development, which we reprint: "Warm or cool your developer to 65° Fahrenheit, as the temperature may necessitate. Pour the developer over the plate in one sweep along the edge. If poured in the middle of the plate towards one side the developer will form a line of developing bubbles on its return flow, and these cannot be got rid of without rubbing the film. There is also danger of these bubbles forming when a small quantity of developer relatively to the plate is used, as the film is apt to become partly uncovered for a few seconds, and bubbles are formed on the film when the developer flows over afterwards. Do not wet the film before development. Use plenty of developer, and use what we recommend. To dry quickly, our plates being very heavily coated, after washing soak in wood alcohol sufficient to cover the plate for about twenty minutes, then pour off the alcohol, remove the surplus moisture from both sides of the plate with some soft material, and leave for a few minutes to thoroughly dry. In case the plates should be found giving surface green fog, in using ammonia, this can easily be removed by placing the negative, after fixing, in a fresh solution of hyposulphite of soda of the same strength as the fixing bath, to which a few drops of saturated solution of ferridcyanide of potassium have been added, so as to make the hypo solution of a light lemon yellow color. Care must be taken, however, not to add too much of the ferridcyanide solution so as to affect the density of the negative."

THE COLLINEAR

SERIES II. F 5/6

can now be fitted to the

POCKET FOLDING KODAK No. 3



No. 3 Pocket Folding Kodak, with **COLLINEAR II, No. 2** and Unicum Shutter . . . $62.00.

COLLINEAR LENS and Shutter only . . . $48.00.

COLLINEAR, Series III, fits

	LENS AND SHUTTER
No. 2 Folding Pocket Kodak	$38.00
No. 3 " " "	$38.00
	LENS
No. 3 Cartridge Kodak	$40.00
No. 4 " "	$40.00
No. 5 " "	$50.00

A COLLINEAR, Series III
doubles the speed of your Kodak
COLLINEAR, Series II
quadruples it.

Sold by all dealers at uniform prices. For descriptive circular C, write to

VOIGTLAENDER & SON OPTICAL CO.
137 West 23d Street : New York

Mr. G. Gennert, the American agent for Hoechheimer's gum-bichromate papers, sends us the following revised instructions for the use of this paper and informs us that these modifications will give prints of closer grain and greater softness than could be obtained with the original instructions:

Sensitize the paper in: Water, 20 parts; potassium bichromate, 1 part; add a few drops of ammonia, sp. gr. .091. To hasten drying, 1 part of 90 per cent alcohol may be added. Pass the prints through this bath thirty times. Drying should be complete in 3 or 4 hours. The exposure should be shorter than usual, as the paper is more sensitive. After exposure wash out the chromium salt with several changes of cold water, giving 10 minutes for this operation. Now place the print for 5 minutes in lukewarm water at 20° R. Develop at a temperature of 25° to 30° R, but use a little sawdust. In case of overexposure, return the print to lukewarm water for 5 or 10 minutes, to further soften the film, then continue its development at 35° R., using a little more sawdust.

◆

Partial Development of Print-out Papers.—A writer in *Photo Chat* says:

It is difficult to understand why the rapid production of gelatino-chloride prints in dull weather or by artificial light by partial development has not become popular. Everybody suffers from the want of good printing light for at least a third of the year, and at the time when many amateurs do most of their printing; and yet a means of reducing the necessary time of exposure to a fraction of that required for obtaining a print of full strength in the ordinary manner seems to be almost totally neglected.

Many workers no doubt adopt the use of papers such as *Velox*, as a way out of the difficulty of securing prints in the winter; and there is plenty of room for papers of this class, which supply a real want. Nevertheless, many go on trying to get print-out prints, and succeeding sometimes to the extent of one per day, who should be glad to avail themselves of a method by which they

Where Weight is Considered

USE SEED'S NEGATIVE FILMS

PERFECTLY FLAT
CANNOT CURL
ACCURATELY CUT
CAN BE USED IN ANY PLATE CAMERA

We supply our 26X, Gilt Edge and Orthochromatic emulsions coated on celluloid and cut to any size desired. Our films are identical in quality with our plates of the same brands. They are much in demand by tourists because of their lightness and convenience. Manipulated and developed same as dry plates.

If weight is a consideration, get our Negative Films for your plate camera. Order through your dealer.

We have just published a new
MANUAL
Send for a copy. Free on request

M. A. SEED DRY PLATE CO.
St. Louis, Mo., 2005 Lucas Place
New York, N. Y., 57 East 9th St.

Kindly mention THE PHOTO-MINIATURE

can enormously increase their output, or decrease the time occupied in obtaining their prints.

It can hardly be that the process of the development of these papers after faintly printing is unknown, for several makers of the best brands give directions and formulæ for such working; but whatever the reason, the fact remains that very few amateurs resort to this means for the more rapid production of prints.

The process is not attended with any very special difficulties, as will be seen from the description which follows of one method and developer by which it may be accomplished.

The paper should be exposed as little as possible to diffused daylight or even strong artificial light; but there is no necessity for the use of only ruby light during the various manipulations, a fair amount of gas or lamplight being perfectly safe.

Printing takes place until the image is fairly visible, and the print is then immersed in a solution of 10 per cent bromide of potassium for ten minutes, the image becoming fainter in this bath. After washing in running water for about ten minutes, the print is developed in a bath composed of equal quantities of the two following solutions:

1.	Hydroquinone	20 grs.
	Sodium sulphite	80 grs.
	Water	5 ozs.
2.	Sodium carbonate	¼ oz.
	Ammonium carbonate	¼ oz.
	Ammonium bromide	10 grs.
	Water	5 ozs.

Development is proceeded with until all detail, except in the highest lights, is well brought out. The prints are then thoroughly washed in running water for twenty minutes to remove all trace of the developer. The prints may then be toned and fixed separately or in a combined bath, and are afterwards treated in the same manner as other print-out prints.

Besides the great saving of time achieved by this process, there is reason to expect the resulting prints to be less likely to fade than those produced in the ordinary

ROSS

NEW EXTRA RAPID SERIES F 5.6

UNIVERSAL

Symmetric Anastigmats

"The most generally useful Lens for the Professional or Amateur Photographer."

THESE New Lenses are aplanatic, working with the Standard aperture F 5.6, superseding the formerly popular Universal Symmetricals in consequence of their freedom from distortion and better covering properties.

No.	Equiv. Focus	Plate Covered			Prices in London
		with Large Stop	with Med'm Stop	with Small Stop	
	Inches				*Dollars*
1	5	3¼ x 2½	3¼ x 3¼	4¼ x 3¼	26
2	5½	3¼ x 3¼	4¼ x 3¼	5 x 4	28
3	6	4¼ x 3¼	5 x 4	6½ x 4¾	29
4	7½	5 x 4	6½ x 4¾	7½ x 5	37
5	9	6½ x 4¾	7½ x 5	8½ x 6½	45
6	11	7½ x 5	8½ x 6½	9 x 7	60
7	13	8½ x 6½	9 x 7	10 x 8	77
8	15	10 x 8	12 x 10	13 x 11	102
9	18	12 x 10	13 x 11	15 x 12	135
10	21	13 x 11	15 x 12	18 x 16	180
11	24	15 x 12	18 x 16	22 x 18	232

Five per cent. discount for cash.

The cost of pairing two lenses for stereoscopic work is $2.

The Circle of Illumination includes an angle exceeding 70°

ROSS LTD.

Manufacturing Opticians

111 New Bond Street London, W., Eng.

SOLD BY LEADING DEALERS EVERYWHERE

way, inasmuch as there is a larger proportion of metallic silver in their composition, and less of the organic compound of gelatine and silver.

Other light than daylight may also be used for printing, such as magnesium ribbon or the incandescent gaslight. A print which developed up to full density was obtained by the writer from a rather thin negative, using the Welsbach incandescent light, and exposing for half an hour at a distance of six inches.

The special precautions necessary to be taken are to carefully keep the paper from exposure to daylight, except when in the frame, and to thoroughly wash the prints in running water immediately after each stage of the process.

⁂

Messrs. Burke & James, Chicago wholesale agents for THE PHOTO-MINIATURE, 118–132 W. Jackson Boulevard, have just published a new catalogue of their manufactures and specialties, which runs to almost 230 pages. It is surprising to note how many specialties of the better sort are manufactured or handled by this young but enterprising firm. They are the sole agents for Spurr's well-known sodium and other specialties, the Claw Plate Handle, Brown's Exposure Disk Globe Backgrounds and the goods of the Electrose Manufacturing Company. In Chicago they have the wholesale trade agency for THE PHOTO-MINIATURE, the cameras of the Rochester Optical Company and the products of Carl Ernst & Company. Under the trade name *Ideal* Messrs. Burke & James have introduced an attractive line of apparatus for amateur photographers, while under the name *Ingento* a new line is appearing, in which Messrs. Burke & James propose to market high grade goods at moderate prices.

Since the above was written Messrs. Burke & James inform us that the whole edition of their catalogue has been taken up and distributed, so that they cannot send it on request; but our readers are cordially invited to call and see the new warerooms and stock when in Chicago. Take any Metropolitan Elevated train on

LEADING DEVELOPERS

METOL The quickest and most energetic of developer
Oz., 75c.; lb., $10

ADUROL Best for intensity and contrast
Oz., 60c.; lb., $8.50

ORTOL Clear and free from fogging; excellent for developing papers
Oz., 75c.; lb., $10

PYROL Improved form of Pyrogallol, clean, compact, easy to handle
Oz., 30c.; lb., $4

HAUFF

◆

G. GENNERT
Trade Agent
NEW YORK

the loop, get off at Canal street and walk two and one-half blocks west to corner of Jackson Boulevard and Desplaines street. The new quarters are probably the largest in the west, and a visit will prove highly interesting.

◆

The Voigtlaender & Son Optical Company announce that whereas hitherto they have been able to fit only their Series III Collinear lens to Folding Pocket Kodaks, they are now able to fit the well-known Series II to the No. 3 Folding Pocket Kodak. This series, so favorably known as one of the best high speed lenses (*f*/5.6), should make a popular outfit when supplied with compact film or plate cameras, as it is four times as rapid as the average hand-camera lens.

This company also have in course of preparation several sizes of their new Apochromat Collinears, *f*/9, a lens which will be appreciated by every process worker, and in particular by those who practice three-color printing. The peculiar advantage of this lens is this, that it reunites perfectly and absolutely the light waves of the three primary colors. Being corrected for these colors it follows that the three images required in the three-color process, the red, blue and yellow, will have exactly the same focal length, and will also be absolutely identical in size. This ensures a perfect registering of the three impressions on the press. The feature is an absolute necessity in first-class three-color printing and the Apochromat Collinear should therefore be an exceedingly useful instrument.

◆

The coal tar derivative fuchsine is generally supposed to owe its name to the fuchsia, as its tint certainly resembles the color of that flower; but this is not the case. The inventor of fuchsine, whose death was lately recorded, M. Francisque Renard, and his brother desired to identify their name with the new product; but not liking to adopt the appellation of renardine, they translated their family name Renard (fox) into the German Fuchs, and thus arrived at fuchsine, says the 'Engineer.'

THERE ARE NOW IN USE OVER

234,000
LENSES

manufactured by
the Bausch & Lomb Optical Co.

This enormous number represents only Bausch & Lomb-Zeiss Anastigmat, Rapid Universal, Alvan G. Clark, Rapid Rectilinear, Portrait, and Wide Angle Lenses, and does not include the millions of simpler photographic lenses produced.

THE POPULAR VERDICT, as expressed by actual purchase and use, is that our lenses are practically WITHOUT A RIVAL.

OUR PRODUCTS ARE OBTAINABLE FROM ALL DEALERS

CATALOGUE FREE

Bausch & Lomb Optical Co.
ROCHESTER, N. Y.

NEW YORK CITY
Broadway and 28th St.

CHICAGO
State and Washington Sts

Kindly mention The Photo-Miniature

There are signs of a revival in the use of ortol as a developer, no less than four queries concerning its use reaching us in a single day's mail last week. The best formula of which we know is that advised by Cramer, and reprinted in these pages a few months ago. As part of a lecture demonstration given before an English society some weeks ago, Mr. H. Dixon Shaw dealt with ortol as follows. Two stock solutions were first made up:

1.—Water (cold), 10 ozs.; potassium metabisulphite, 35 grs.; ortol, 70 grs. 2.—Water, 10 ozs.; sodium carbonate cryst., 1¼ oz.; sodium sulphite cryst., 1¾ oz.; potassium bromide, 5 to 10 grs.; sodium hyposulphite in solution (5: 100), 2½ grs. Mr. Shaw first explained five factors that affect photography so far as development is concerned. First, the effect of the temperature of the developing solutions; second, the concentration or dilution of the developer; third, underexposure; fourth, overexposure, and fifth, correct exposure. The first demonstration was the effect of temperature. For this, six lantern plates were all exposed exactly alike to the same negative, and three developed with the solutions at 35° Fahr., the other three at summer heat of water, 60 to 65° Fahr. The difference in time of the development was surprising, and, had the members not known that the one solution was colder, they would have concluded, from the longer time taken in development, that it had been underexposed. The second demonstration was six negatives all exposed alike, but three being developed in a concentrated developer, the other three being in the same proportions of developer, but diluted with water. The following were the proportions used in the second demonstration: Concentrated A.—Ortol solution, ½ ounce fluid; soda solution, ½ ounce fluid; water, *nil.* Diluted B.—Ortol solution, ½ ounce; soda solution, ½ ounce; water, 2⅛ ounces. The difference here again was remarkable, the time of development in A being five and a half minutes, and in B eleven to thirteen minutes, the resulting negatives being very much alike, the diluted developer, according to the general feeling of the members, giving, if anything, the better negative.

Trade Mark

Actien-Gesellschaft für Anilin-Fabrikation, Berlin S. O.
Photographic Department

Manufacturers of:

IMOGEN, Patented

The Latest Novelty in Developers

Can be obtained of all dealers.

Prices:	1 oz.	4 oz.	8 oz.	16 oz.
	$0.37	$1.20	$2.10	$3.95

IMOGEN is particularly adapted to the modern highly sensitive plates.

IMOGEN works clearly and brilliantly.

IMOGEN produces all the gradation, from density to fine detail, the resulting negatives being therefore of the highest grade.

IMOGEN is not much affected by ordinary variations in temperature.

IMOGEN does not injure the fingers.

IMOGEN answers very well for "stand-development."

IMOGEN answers for development of lantern-slides.

IMOGEN " for development of diapositives on gelatino-bromide plates.

IMOGEN " for development of bromide papers, etc.

EIKONOGEN ★ AMIDOL

RODINAL ★ DIOGEN

Pamphlet on Developers (2d edition 1900)

containing in 20 pages detailed descriptions and instructions for use

——— Free on application ———

through all dealers or through the following importers:

E. & H. T. ANTHONY & CO.
122 and 124 Fifth Ave., 17th and 18th Sts., New York

MALLINCKRODT CHEMICAL WORKS
St. Louis, Mo., and 90 William Street, New York

THE SCOVILL & ADAMS CO., OF NEW YORK
3 and 5 West 19th Street, New York

GEO. MURPHY, 57 East 9th Street, New York

G. GENNERT, 24 East 13th Street, New York

Universal exhibition Paris 1900: Gold Medal

Kindly mention THE PHOTO-MINIATURE

The third demonstration comprised a series of negatives exposed for one-fifth second, for one second, and for four seconds, to give the effects of under-, correct and over-exposure respectively. The proportions of Nos. 1 and 2 solutions were varied as follows to give the best development possible, and we may say that, amid much suppressed excitement, the gradual formation and development of the plates was keenly watched: Under exposure.—Ortol solution, 10 parts; soda solution, 15 parts; water, 60 parts. Correct exposure.—Ortol solution, 15 parts; soda solution, 15 parts; water, 15 parts. Over-exposure.—Ortol solution, 22 parts; soda solution, 15 parts; water, 10 parts; bromide, ½ grain.

◆

Our readers are reminded that the Second Chicago Photographic Salon will be held October 1 to 22. Entry forms and full particulars may be had on application to Chicago Photographic Salon, Art Institute, Chicago. All exhibits are to be delivered not later than 5 P. M., September 9. The jury of selection is composed of Henry Troth, Philadelphia, W. B. Dyer, Chicago, and W. Schmetdgen, photographers, and J. H. Vanderpoel and C. F. Browne, painters.

◆

Pinhole Photography.—Before the Belfast Camera Club last week, Mr. D. W. Elliott read an excellent paper on pinhole photography, which, he said, was sure to be looked on with more favor when its simplicity and beautiful results became more familiar. Describing a camera which he constructed himself, Mr. Elliott said it was made from a cigar box 8 inches long, and reduced otherwise to carry a quarter-plate. At one end and in the center a hole was bored ¼ inch in diameter; over this was glued a thin sheet of silver ½ inch in diameter, in which there was a pinhole about $\frac{1}{70}$ of an inch in diameter, made in the following way: Let them select a No. 11 needle, insert it down the center of a cork, so that at one end they could just feel the needle point, and at the other end the eye. Now let them place the piece of silver or other metal on a piece of hard wood,

$610 Cash Competition

WITH GRAND PRIZE
OF $200 IN CASH

for Prints on

"ROTOGRAPH"

Bromide Paper

Send 2-cent stamp for particulars of Competition, or

Better still

Send 10 cents for sample package of "Rotograph" Paper, circular of Competition and copy of our new magazine

"*The Bromide Monthly*"

* *

"ROTOGRAPH"

B. RUSSEGER } *Selling Agents*
E. S. MAPES

101 Fifth Ave., New York

Kindly mention THE PHOTO-MINIATURE

and on it put the cork, with the point over the place where the hole was required, administer a smart blow with a hammer, and they would have a hole of the diameter of the needle. In that way a very fine needle could be put through a penny without difficulty. With regard to focus, it was generally supposed that there was some definite relationship between focus and the size of the pinhole. In theory there might be, but in practice there would appear to be none. He had worked with pinholes varying from $\frac{1}{50}$ to $\frac{1}{75}$ of an inch.

⁂

The Illustrated Press Bureau, 10 Norfolk street, Strand, London, is an agency which promises great usefulness to American photographers desiring to "place" their photographic work before British publishers with a view to its use by them at remunerative rates. Among the directors we notice the names of Robert McClure and H. Snowden Ward, so that it will be seen that the agency is under experienced management. The advantages offered to photographers are:

(*a*) A London office where prints may be stored, carefully arranged, and indexed.
(*b*) Prompt offer to editors of any subject in stock which may become interesting.
(*c*) Submission to *every* likely editor in London, of any subject of immediate importance, directly upon receipt.
(*d*) Payment on acceptance by an editor, without the usual delay until some time after publication.
(*e*) Connections on the Continent and in the United States.
(*f*) Assistance in registering copyrights, and advice on copyright matters.
(*g*) Appointment as local "special press photographers," who will receive commissions for special work, suggestions of speculative work likely to be profitable, etc.

⁂

Mr. J. Harry Lamson, Portland, Maine, sends to our table a charming souvenir of albertype views of Port-

LOVELL
COLOR DIFFERENTIATING
PLATES

Positively the best orthochromatic plates in the market. Sensitive to the entire spectrum, giving brilliant negatives; simple in manipulation.

May be had "backed" on request in two speeds
C. D. "FAST" and C. D. "MEDIUM"

OBTAINABLE FROM DEALERS OR DIRECT FROM FACTORY
SEND FOR PRICE-LIST AND SPECIAL CIRCULAR

LOVELL DRY PLATE MFG. CO.
NEW ROCHELLE, N. Y.

Denver: Hart Bros. & Wells
Western Depot: 64 Wabash Avenue, Chicago
Kindly mention THE PHOTO-MINIATURE

land, which gives one a clear idea of the town and locality. The first page is appropriately given up to a portrait of the poet Longfellow, with views of his residence and birthplace.

❧

Messrs. August and Louis Lumière, of Lyons, France, send a copy of their paper on "Photography in Colors," as presented before the Photographic Society of France last April. The pamphlet gives a concise description of the Lumière method of producing photographs in colors by the superposition of three colored images.

❧

We have received announcements of the forty-sixth annual exhibition of the Royal Photographic Society, which will be held in the new gallery, Regent street, London, from September 30 to November 2.

❧

Lenses for Studio Use.—It is generally agreed, says the editor of *Photography*, that the longer the focus of the lens employed in the studio, the better will the results be. When we look at full length figures on, say, whole plates taken in a short studio, this fact is self-evident, and, although it is not so noticeable on small plates in the case of busts, cabinet heads, and so on, it is there all the same, and for really good work, such a studio is limited to small sizes. For these it is, of course, by no means necessary to employ a portrait lens—in fact, some of the finest portrait work we have seen recently has been done with as long a focus rapid rectilinear, of a very cheap make, but fair quality, as the studio would permit. We get such a number of enquiries as to the most suitable lens for portraits, that a few words here may save us much correspondence, a thing not to be overlooked. For portraiture where the feelings of the sitter play a second part, that is to say, where it is first desired to produce a picture, flattering the sitter, or enabling him to count the hairs of his moustache, or the threads of his necktie, not being taken into account, the most generally useful lens is the Bergheim-Dallmeyer,

SPURR'S

SODIUM

Is a combination of sodium salts prepared in dry form, 2½ times stronger than soda crystals . . . . .

In comparing the cost of

SPURR'S SODIUM

Remember it is two and a half times stronger than Crystals, and that one pound Sodium and one ounce Pyro will make four gallons of developer that cannot be equaled in quality by any other known formula. The leading operators of the day are using it and speak of its merits. If you want fine chemical effects, with detail in both high-lights and shadows, you cannot get it with impure and cheap chemicals. You will also be surprised to find your fingers are not all stained when using Sodium.

St. Joseph, Mo.

In reply to your inquiry, I would say the fact that I have used your chemicals for producing the negatives for our exhibit at Detroit meeting of the P. A. of A., is the best evidence that I am pleased with them. Yours truly, L. G. Bigelow.

For Sale by all Photo Stock Dealers

PRICES:

1-lb. can, 35 cts.; ½-lb. can, 20 cts.

BURKE & JAMES

Sole Manufacturers of Spurr's Specialties

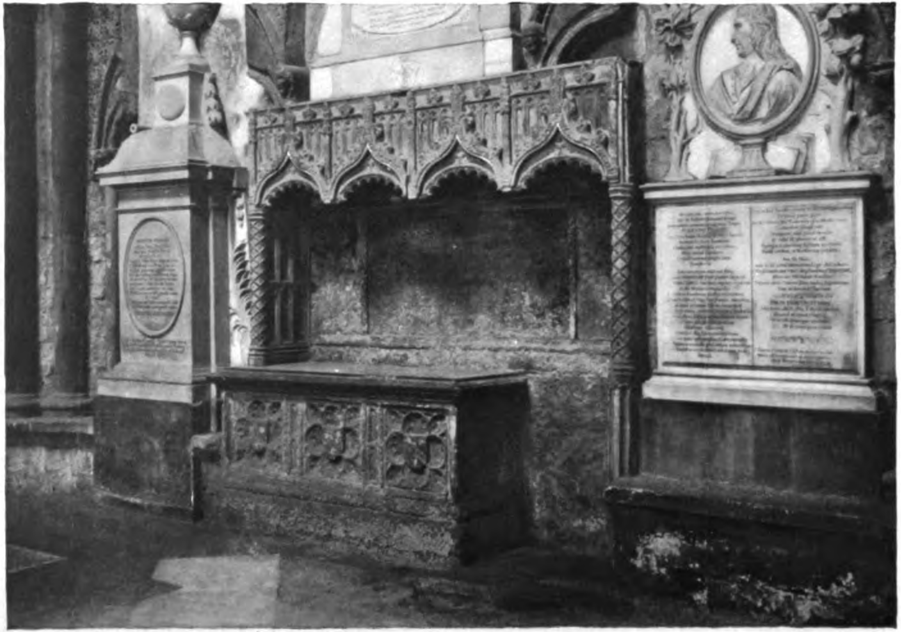
118 to 132 W. Jackson Boulevard, Chicago

Kindly mention The Photo-Miniature

on account of its flexibility. It must be supplemented by an instrument which will give better definition, as the diffusion of focus it gives does not suit all subjects. For this purpose a long-focus single lens, such as can often be bought very cheaply second-hand, a rapid rectilinear, or an ordinary portrait lens, do very well. The single lens forming half of the rectilinear can often be used with advantage. The anastigmat and other modern types are useful when the maximum degree of definition is wanted, but pictorial portraiture, for which they are well suited, does not demand the qualities which they possess *par excellence* to the same extent as other branches of photographic work. At the same time, if the photographer has them, or needs them, for his other work, there is no necessity to buy fresh lenses for the studio, if those he has are suitable in the matter of focal length.

◆

We are advised that Messrs. Chapman & Hall, London, will shortly have ready a new book containing an electro-photographic investigation of consecutive phases of muscular actions, by Professor Eduard Muybridge. It will be illustrated with large numbers of full-page photo-mezzotint engravings, reproduced from original negatives. The book is entitled "The Human Figure in Motion," and will form a companion volume to "Animals in Motion," published last year. The value of the photographed phases of motion in this and the previous volume consists, not as individual photographs made at particular instants in the performance of some muscular act—which anyone with a hand-camera could do equally as well—but as seriates of phases, demonstrating the various changes which take place in the disposition of the limbs and body during the evolution of some act of motion from its inception to its completion. Studied in this manner, the author is not without hope that the artist will realize a just appreciation of the movement itself, and be enabled to give expression to it in an acceptable and truthful manner. Mr. Muybridge is to be congratulated upon his continued activity in this direction, and in the cause of art and truth.



THE TOMB OF CHAUCER, WESTMINSTER ABBEY
Catharine Weed Barnes Ward

The Photo-Miniature

A Magazine of Photographic Information
EDITED BY JOHN A. TENNANT
Volume III SEPTEMBER, 1901 Number 30

PHOTOGRAPHING INTERIORS

The discussion in these pages of so commonplace a subject as photographing interiors will doubtless surprise some of the less thoughtful. Nevertheless, there are few applications of photography at once so useful and so genuinely interesting about which photographers are so wofully ignorant. The explanation is not far to seek. Interior photography is like violin playing, quite easy until one tries it. And, in America at least, comparatively few amateurs have attempted the difficult but fascinating problems involved in making an acceptable photograph of the average interior. A direct result of this indifference is the widespread delusion that interior photography is nothing more than everyday photography *plus* a wide angle lens. As we shall see, it is quite another story.

Then, too, we have lacked the inspiration of example, such as our British brethren have enjoyed in abundance. It is unfortunate, indeed, that the so-called leaders of photography as an art in America have thus far confined their genius to landscape and the figure, completely ignoring the possibilities of the interior. What these possibilities are, and how magnificently they have been appreciated abroad, may be seen in the work of Evans, Dovaston, Bulbeck, Bland, Greatbatch, Oakden, Stuart, Bennett and others of the British school, reproduced in "Photograms of the Year," 1895–1900, and elsewhere. Their technique—and technique counts for much in photographing interiors—is well nigh perfect. But they make us forget the photograph—the process—and we see only what they saw, as they saw it. In the work of these men that rare quality, the spirit of place, is expressed with as much fidelity as the purely physical features of the subject. This is interior photography as it should be done.

We are all conscious of this spirit of place and responsive to its influence in everyday life; but I am not sure that we fully appreciate its intimate relation to the pleasure we get from our work with the camera indoors and out. To those familiar with Mrs. Meynell's charming essay on the subject, or Walter Pater's equally delightful sketch, "The Child in the House," the significance of this spirit of place needs no emphasis here. It is to interior photography what the soul of the man or woman is in a portrait, an indefinable quality not revealed to those whose minds are busied with the grosser details of tools and methods. To seek after it, and to invest our work with its subtle charm, is to make both work and life vastly more interesting.

Before we can attempt work of this sort, however, we must first master the photographic or technical part of interior photography. Interiors such as "The Wheelwright's Shop" (Greatbatch), and the "Attic: Kelmscott Manor" (Evans), are possible only after the technics of the field have been thrice learned and thrice forgotten. Here, then, we have reason sufficient for this little book, wherein, as briefly as may be, I propose to set forth what the reader must know in order to win pleasure and profit in photographing interiors.

Sources of Information

The sources of information concerning interior photography are very few, as any one may discover for himself by looking for references to *interiors* in photographic textbooks and periodicals. This is perhaps accounted for by the general indifference to the subject. More surprising is the paucity of definite information in the score or so of articles published during the past few years, written for the most part by men thoroughly acquainted with the practical difficulties of the field. In what follows, therefore, I am obliged to fall back on personal experience, supplementing my slender store with every reliable hint obtainable from books and scattered papers. The interested reader is urged to round out the story for himself by collecting examples of interior photography, good, bad and indifferent. Many valuable suggestions can be had from the repeated study of these after the essentials are known.

Picture Material

First, a word to the American reader about what, for lack of a better phrase, I must speak of as picture material. In looking over such examples of interior photography as may be readily accessible, or in recalling interiors seen during walks abroad, the reader will be tempted to complain that we lack, in this country, the rich profusion of attractive subjects—cathedrals, parish churches, historic houses and the like—with which European workers are blessed. It may be suggested that our great buildings are utilitarian in purpose and design; that our architectural styles are generally "mixed;" and that the magnificent homes of our wealthy people are more jealously guarded from intrusion than are the show places of Europe. There is truth in the complaint. So much depends upon the point of view. And no master has yet arisen, as Steichen did in landscape, or as Käsebier did in portraiture, to show us how much of beauty and interest may be hidden even in an American interior!

Let us not mistake our purpose. We seek here to know how to photograph interiors, regardless for the moment of their character or attractiveness, whether we find them at home or abroad. The pleasures of photography should be sought not in the grandeur or beauty of the subject, but rather in the power it gives us to express interesting things and ideas in an interesting way. Let the man within reach of the cathedral record its proud beauty or its mystery; and let another picture the living-room of the Texas ranch house,—only so that each shall give us the spirit of the place instead of the mere diagram. If we cannot always have pictorial or historic interest in our interiors, we may perchance get the human interest in them. And the children's playroom with its delightful disorder, or the modern factory with its swirl of life and power, may interest more than the fretted roodscreen of an ancient church or the grandeur of a baronial hall. We have, in truth, picture material enough at our doors if we can but interpret its peculiar charm and interest. It used to be said that our clear atmosphere and cloudless skies made it impossible that American landscape could ever approach that produced by English or continental workers. Our portraiture was spoken of as technically clever, but lacking in the finer quality of art. We have changed all that. Why should we not do something worth while with our interiors?

Broadly speaking, interior photography falls into three classes: home interiors, commercial or industrial interiors, and the interiors of churches, public buildings and the like. These will probably interest American readers in the order here given. On the other side of the Atlantic, despite the charm of the old world homes, ecclesiastical interiors completely monopolize the affections of beginner and expert. The apparatus or equipment required varies only in minor details from that used in everyday work. There are certain difficulties, such as the problem of illumination, halation, the management of perspectives, and lack of working space, which are common to all interior photography. It is in the treatment of the subject, and the adaptation of means to ends, that each class demands separate consideration. We will dispose of the detail of equipment first, and afterward take up the methods best adapted to this or that class of subjects.

The Camera

The hand camera is so universally used nowadays that I hesitate to even so much as mention the old style field or view camera and its cumbersome tripod. Nevertheless, the field camera of ten years ago, solidly built, with ample rising and falling front, equally generous swing movement pivoted at the center of the back, folding baseboard, reversible back, and square bellows body sliding forward on its bed, is unmistakably the most satisfactory of cameras for serious interior photography. The reasonableness of this will be apparent to the man who attempts interior work with a folding hand camera of the modern sort—the pocket brand. Fortunately many hand cameras are also stand cameras, and have some if not all the movements and conveniences of the old field camera. Are they really essential? Let us see. A ground glass or focusing screen is, of course, indispensable unless the new focusing finder announced by Nehring is available. For dark interiors the focusing screen will possibly need special preparation. We will discuss this later. Solidity of construction is helpful as providing against the danger of vibration or movement during a prolonged exposure. I have given exposures of from six to eight hours in places where people were constantly passing and repassing within a few feet of the camera. Many of my readers have doubtless experienced the practical difficulty of keeping an extended hand camera quite still during a lengthy exposure in a city house. The square bellows body permits the use of a wide angle lens, without fear that the folds of the bellows will intercept the view on its way to the plate. The rising and falling front is exceedingly useful to cut away undesirable foreground or secure more roof space when needed. If the camera lacks a reversible back, then the sliding front should have a lateral as well as a vertical movement, or we will miss the help of the rise and fall when photographing subjects on the plate in a vertical position. This use is frequent in photographing lofty interiors. The advantage of the camera-back sliding forward on its bed, or of the baseboard being hinged to fall in front, lies in the fact that this obviates any chance of the front of the camera bed appearing on the plate when an extreme wide-angle lens is employed, as in small interiors. The swing back may not often be needed, but is immensely useful at times. The reversible back should be one which will permit us to draw the slide or holder from any of the four sides of the camera at will, as may be necessary when working in awkward corners or restricted spaces. The focusing arrangement should be by rack and pinion at the side of the lensboard, instead of by a release at the back of the camera, or under the lens and shutter—for the same reason. The focusing cloth should be ample in size, and a little lens shade should go with the camera to provide for ease in focusing, and obviate the danger of concentrated lights being reflected into the lens.

Expedients So much for the ideal equipment. The majority of my readers will probably have to do what can be done, with such apparatus as they already possess, despite the fact that its shortcomings may limit the possibilities of the field. In such cases a little ingenuity will often provide a way out of difficulties. Thus, when a wide-angle lens must be used with a tapering or conical bellows camera, the front folds of the bellows must be pulled well forward and securely fixed to the standards carrying the lens board. In this position they are not likely to interfere with the passage of the image to the plate. In folding hand cameras the swing back may be, in a measure, replaced by raising the folding baseboard of the box so that it is inclined at a slight angle to the back of the camera. The latter, of course, must always be parallel with the perpendicular face of the subject. A quick working level, or a plumb indicator such as that made by the Thornton Pickard Company, fixed on two sides of the camera, will more than replace the squared lines of the field camera and ensure vertical lines where required in our interiors. To further facilitate the adjustment of the image on the plate, the ground glass screen should be ruled with a finely pointed pencil into inch squares. Care must be taken to see that the ruled lines are absolutely parallel with the sides of the camera.

The Tripod The long exposures sometimes required in photographing interiors, apart from comfort in working, demand a really reliable tripod. For home work any fairly strong tripod which will support the camera at four or four and a half feet from the floor will suffice. For some commercial and ecclesiastical interiors we will need a sturdily built affair, of ash or other tough wood as rigidity is essential, with sliding instead of folding legs, and an extension capacity of six feet or more. The tripod should have a solid, roomy top, into which the legs will fit snugly and securely, without fear of slipping away at a critical moment. Add Mellen's indispensable tripod-stay to the equipment, and our tripod will be equal to all emergencies. The tripod-stay will usually obviate any need of corks, rubber mats, tips, and similar devices much advised to prevent the apparatus from slipping on smooth or polished floors. In exceptional cases three sound corks, previously bored to receive the metal pins at the ends of the tripod legs, will be useful. There are few things more exasperating than to have the camera slip at the end of a prolonged exposure. In selecting a tripod, therefore, the proverbial ounce of forethought should not be left out.

Lenses

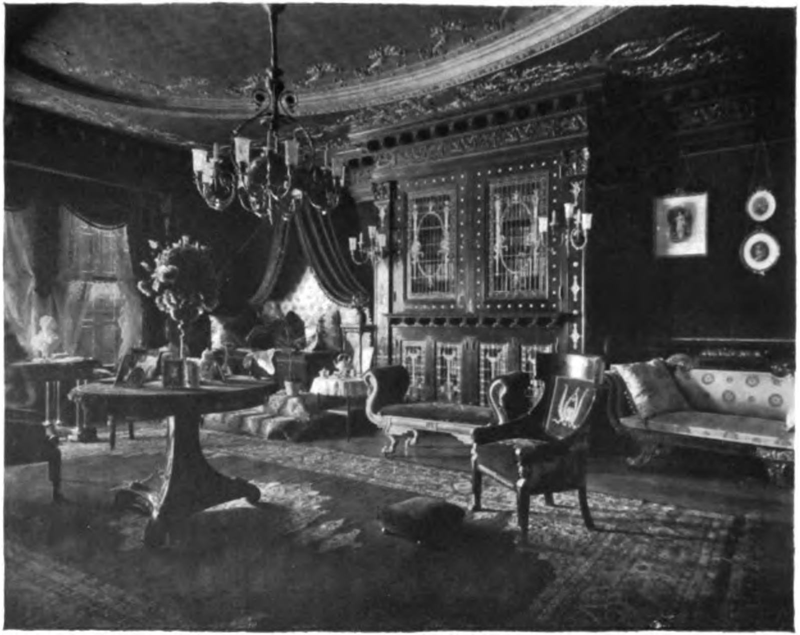
The consideration of lenses for interior photography opens up a few interesting problems. It is invariably advised, for instance, that only rectilinear (or doublet) lenses should be used for interior work, in order to avoid the curvilinear distortion (or curving of the straight lines falling at the edges of the plate) inherent to the use of "single" lenses. The advice is sound and should be faithfully followed wherever possible. But an examination of hundreds of interiors made with inexpensive cameras, fitted with the cheapest of single lenses, has failed to show a single instance of curvilinear distortion. This I mention simply that the amateur possessing only a single lens may not be deterred from attempting interiors, provided that he keep his ambition within reasonable bounds. I may also mention that we now have "single" lenses, such as the elements forming Gray's Double Stigmat, which are practically rectilinear. It is, of course, indisputable that the rectilinear lens offers decided advantage over the ordinary "single" lens for any work involving the reproduction of straight lines.

About Angles of View

The most interesting of lens questions in interior photography, however, concerns the angle of view included by the lens, i. e.: the amount of subject it will give upon the plate. Never was so simple a matter so strangely misunderstood! When we enter an interior, whether it be a small room or a church, the eye seems to take in the whole interior at a glance. We know, as a matter of fact, that this is not so. But so great is the power of accommodation possessed by the eye, so rapidly does it vary the angle of view and focus subjects at varying distances, that we apparently see the whole interior with agreeable definition at one time.

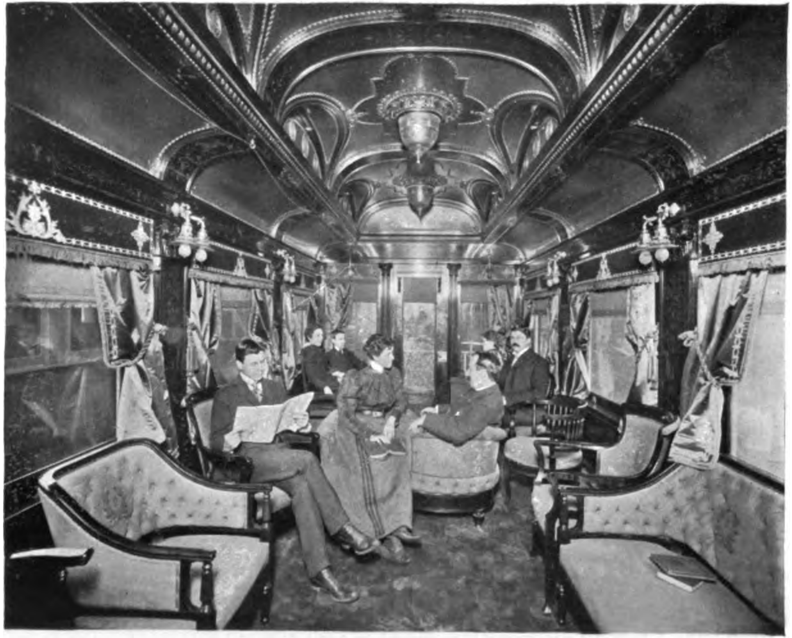
When the amateur attempts to photograph an interior, using the rectilinear attached to his hand-camera, he is surprised by the small amount of view included on the plate. Do what he will, the lens refuses to give more than a corner of the room, or a window with part of the adjoining wall. He retires as far as possible, but there is a limit to the working space, and the fact is apparent that the lens will include so much, and no more. This narrowness of view angle has not impressed itself upon his notice in outdoor work. In the negative of the interior it is painfully evident. He overlooks the fact that the lens is but a glass eye, and possesses but one focal length. Questioning a friendly dealer he learns that different lenses will include different amounts of the subject upon a plate of given size, and he is advised to use a "wide-angle" lens for his interior work. A "wide-angle" lens is accordingly purchased, and the resulting negatives are more satisfactory in that they include perhaps three sides of the room where before only one side could be persuaded on the plate. It is observed that the "wide-angle" is less rapid than the rectilinear; it may be noted that its focal length is less than the rectilinear, and that the perspective effects are "peculiar." But these details are not always appreciated by the untrained eye.

Why does the wide-angle lens give a larger amount of the subject on the plate than the rectilinear? Briefly, because of its shorter focal length. The angle of view (or amount of subject) included by a lens is determined by the relation of its focal length to the base measurement (or diagonal, as some prefer) of the plate with which it is used. This simple rule is worth remembering. If the focal length of the lens is less than the base measurement of the plate used, it will include a wide angle of view. Thus a lens of 3½ inches focal length, used with a plate 4 x 5 inches, will include a field of view of over 70°. If the focal length of the lens is equal to the base line of the plate used it will include only a moderate or medium angle of view. Thus a 5-inch lens will include on a 5-inch plate an angle of view of only 53°. Proportionately, as the focal length of the lens exceeds the base measurement of the plate, the an-



A FIFTH AVENUE, NEW YORK, INTERIOR

C. C. Langill



A "DRAWING ROOM" CAR INTERIOR

Flashlight' and daylight combined

George E. Mellen

gle of view included will be narrowed. In the portrait lens of the professional studio, for example, with a focal length of 10 inches for a plate measuring 5 inches at its base, the angle of view does not exceed 28°. The angle of view included by any lens upon a plate of given size may be ascertained by reference to Woodman's *Table of View Angles*, given in THE PHOTO-MINIATURE No. 1: *Modern Lenses*. A simpler way is to avail oneself of Mellen's pocket view and angle finder. This is a sliding rule which tells at a glance the angle of view in degrees, and the actual amount of subject, which a lens of known focal length will include on a plate of given size. It does away with uncertainty as to whether this or that will be in the negative, and is peculiarly useful in interior work.

Angles by Use

From what has been said the reader will have perceived that we can vary the angle of view included by a lens by using it with plates of different sizes—smaller or larger than that for which it was intended by its maker. In catalogue descriptions of many anastigmats, for instance, we are told that "with the smaller stops this lens may be used on plates one and two sizes larger" than the normal size for which it was made. The stop has nothing to do with the angle of view, it simply helps in securing sharpness of definition. It is the change in the relation of the focal length of the lens to the base line of the plate used which results in the variation of the field of view. Thus, a lens of 7 inches focal length, used with a 4 x 5 plate, is for the time being a narrow-angle lens, the field of view being less than 40°; used with a 5 x 7 plate, it serves as a medium-angle lens, giving on the 7-inch base an angle of view of 53°; while, if used with an 11 x 14 plate, it is a wide-angle lens, and will include an angle of view of 90°. These are called "angles by use," because they vary with the size of the plate employed.

The "Wide-Angle" Lens

It must not be supposed, however, that this variation is possible with all lenses. We are practically restricted by the fact that lenses are limited in covering power, i. e., as to the areas over which they can project a sharply defined and evenly illuminated image. The 7-inch lens mentioned above would include a field of view of 90° on the 11 x 14 plate; but it does not follow that the image would be as sharply defined at the edges as at the center of the plate, or that the whole of the plate would be evenly illuminated. As a matter of fact, the definition would fall away after the normal circle of definition was exceeded; and the corners of the plate would be shrouded in darkness, simply because the lens was not constructed to cover so large a plate. It is true that by "stopping the lens down" considerably, we can extend the apparent definition of the image, but this will necessarily cut away the light from reaching the corners of the plate, and the negative will be unsatisfactory. To accomplish this desirable end, i. e., to provide a lens capable of including a wide angle of view, and at the same time cover the plate in a satisfactory way as regards illumination and definition, opticians produced the modified rectilinear sold by stores as the "wide-angle" lens. Given two lenses of equal focal length, a "wide-angle" constructed to cover a plate 11 x 14 inches, and an ordinary rectilinear made to cover a plate 6½ x 8½ inches: if we take a view on a 6½ x 8½ plate with the "wide-angle," will we get a larger amount of the subject than we could get with the rectilinear on the same plate? No. Why? Because the two lenses are alike in focal length and there is, therefore, the same relation between focal length and base line of plate in each case. Where, then, is the advantage of the wide-angle over the rectilinear? In the fact that it will cover the larger plate when required.

The covering power gained in the wide angle, however, is secured by sacrificing speed. The average rectilinear has *f*/8 as its largest aperture; the average "wide-angle" rarely exceeds *f*/16, although in some of the newer wide-angle anastigmats we have an aperture as large as *f*/12.

Perspectives

The rectilinear lens attached to the average camera for 4 x 5 plates has a focal length of 6 or 6¼ inches. It includes, therefore, a moderate angle of view of about 50°, corresponding to that of the eye. Hence the perspective effects given by the ordinary rectilinear are usually acceptable and pleasing to the eye—provided always that the point of view is well chosen. In so far as we depart from this normal view-angle of 50°, whether from choice or necessity, we will obtain perspectives to which the eye is unaccustomed, and which will therefore be spoken of as unnatural, exaggerated, etc. This is the conclusion of chief importance to be drawn from what we have learned. It should be clearly understood that in the wide-angle lens we have great power for good and evil, and this power should be used with the utmost discrimination. There are times when an extreme wide-angle lens must be used if we are to photograph the subject at all, as in the case of small rooms, factories and other places where the working space is very much restricted. Here the wide-angle will do what no other lens will do. But the better sort of interior photography has little use for the wild-eyed wide-angle, and for a large majority of our interiors a lens embracing an angle of view between 70° and 75° will give the greatest amount of pleasure and satisfaction.

Making a Choice

Having thus covered the principal lens questions bearing directly on interior photography, the selection of a lens or lenses should not be a difficult task. Among lenses embracing a medium angle of view, we have choice of the new Ross Symmetric Anastigmats, the Collinear, Series III; the Goerz, Series III; Gray's Double Stigmat, and the Zeiss, Series VIIa. These anastigmats have an advantage over the older lenses in that they are corrected to cover an area much larger than the size of the plate for which they are listed. This is useful, not only as permitting the lens to be used on a larger plate, but also as insuring satisfactory definition and illumination when, by use of the rising front, we shift the center of the plate so that it no longer coincides with the axis of the plate—its normal position.

For subjects demanding a view angle exceeding 90°, we must have recourse to Gray's Extreme Angle Periscope (an old favorite of mine), or the Zeiss Protar Series V. These lenses include a field of view of over 110° on the diagonal of the plate for which they are listed. Need I repeat that the perspectives necessarily appeal to the imagination, and that such instruments should be used with fine discretion. For the usual wide-angle lens, including, that is, an angle of view from 70° to 90°, the Collinear, Series IV; Ross' Wide-Angle Symmetrical, the Goerz, Series IV; or Morrison's Wide-Angle lens will be found quite satisfactory.

Apart from these highly corrected objectives, there are many less expensive wide-angle rectilinears capable of thoroughly good work. Of these I can speak from experience of the Darlot W. A. Hemispherical and Wray's W. A. Rectilinear.

Let me add a word in my own behalf. If past experience means anything, it means that this paragraph will bring letters to my table from appreciative readers, asking me to name (in strict confidence) my personal choice among the above. This is a question which cannot be answered satisfactorily. I have done good work with most of the lenses mentioned. I have seen magnificent work done with them all. The only way by which to tell which of two lenses of high repute is the better is to test them side by side on the same subjects, under conditions as closely alike as possible. This is the plan I follow. It is of little matter, after all, if the makers' catalogue says this or that, unless *our* results bear out their claims. The negative tells the story best, and is not afraid of the truth. The negative will tell you about definition and illumination; the focal length of the lens and the base line of the plate will tell you the angle of view; your own common sense will do the rest. These are the essentials.

Halation and Plates

When we photograph against the light, as in photographing an interior where a window is included within the angle of view, we will see in the negative that the light entering the window has spread beyond its proper boundaries in the film, so that the window frame and its furnishings are enveloped in an unsightly blur of light fog or halo which veils or obliterates all detail in that part of the negative. In other words, the patch around the window is locally overexposed. This is known as halation, the result of an excess of light spreading itself among the particles of silver bromide forming the sensitive film. As halation is not found in film or paper negatives, it is usually attributed to the reflection of light from the glass support back into the film after it has once passed through the film and completed its work.

Until very recently halation was one of the chief difficulties in interior photography, but now we have plates so prepared, or means of preparing plates, by which halation may be completely overcome. This is accomplished in various ways. First: we may back the plate, i. e., coat the glass side with a non-actinic composition which will absorb any light reaching the glass and so prevent its reflection back into the film. Second: we can obtain plates ready backed for use. Third: we can obtain double-coated or non-halation plates which are coated first with a "slow" and then with a "rapid" emulsion, so that the full exposure required is completed before light can reach the glass support carrying the two-fold film. Or we may use films which have neither double-coating nor backing, halation being obviated under ordinary conditions by the absence of any glass support to reflect light back into the sensitive bromide of silver film.

Non-Halation Mixtures

Halation, therefore, is no longer a practical difficulty, but can be overcome by a very little forethought. If we desire to "back" our own plates as required for use we need, first, a composition that is effective, which will not injure the plate-holders, and which may be easily removed during or before the development of the plate. Among commercial preparations Newcomb's Improved Backing is as perfect a mixture as the heart of man can desire and convenient in use. Or we may employ a home-made mixture as follows: thoroughly mix, caramel, 1 ounce; strong solution of gum arabic, 1 ounce; burnt sienna, 2 ounces; and alcohol 2 ounces. See that the mixture is free from grit or lumps, and bottle in a wide-mouthed bottle. The mixture advised by Mr. J. Horace McFarland in THE PHOTO-MINIATURE No. 13: *Photographing Flowers and Trees*, is another good "backing."

Backing Plates To "back" an ordinary or orthochromatic plate is easier than to describe how it is done. A dozen or two should be "backed" at one time and put away (after the "backing" is thoroughly dry) until required for use. Here is the method generally advised to "back" plates quickly and without messy handling. Procure a piece of stout board three inches larger each way than the plates to be "backed." At the center of the board glue a piece of canton-flannel or velvet of the same size as the plate. Now cut a piece of cardboard the same size as this wooden base, choosing card of the average thickness of a plate, and hinge it to the base-board so that it will fold over it. At the center of this card cut out a rectangular space exactly the same size as the plate. When it is folded over the base-board this open space will be exactly over the velvet square. The plate to be coated or "backed" is placed, face down, upon the velvet, and fits it closely in this square recess. The backing may now be applied with a small sponge or wad of cotton. See that it is evenly covered, then lift the cardboard and remove the plate, handling it by its edges. Store in a rack and dry in a room free from dust. Of course, this "backing" and drying must be done in a room where no white light can reach the plates. The "backing" device may be used repeatedly, the velvet and cardboard being renewed when needed.

Backed Plates On the other hand, we have in Lovell's "backed" plates a good plate all ready for use, backed with a non-actinic composition reinforced with absorbent black paper, simple in manipulation and effective in results. I have seen an interior of a railway signal cabin, which is a veritable house of glass, photographed on a Lovell "backed" plate. The negative shows every detail in lights and shadows, and no trace of light fog or halation. Even the railroad ties extending beyond the cabin may be seen through the window at one end of the room.

Non-halation Plates Double-coated plates are made by the Seed, Hammer and Cramer concerns, and have proved their great utility in many a fine interior. These double-coated plates offer considerable latitude in exposure, the slow film making it difficult to overexpose, an advantage which we can fully appreciate in photographing interiors where we need long exposures to get details in the shadows. As this is being prepared for press, I learn that hereafter all the various brands of Cramer plates may be had double-coated. This will prove a further convenience to the users of Cramer plates, and is a step in the right direction. While I cannot agree with the enthusiasts who claim that a "backed" plate is better than one not "backed" — for all subjects and at all times — there can be no doubt about the practical advantage to be obtained by having always a choice between "backed" and unbacked plates, without the necessity of abandoning one's favorite plate.

Home Interiors

We are now familiar with our tools and can take up actual work with interest and in an intelligent way, beginning with home interiors as possessing the larger interest for the greatest number. There is a big field of pleasure, and ample scope for profitable experience, in the domestic interior; and the quiet, diffused light of the months from October to March is altogether favorable to our purpose.

In his first attempts the reader will probably be discouraged by the way in which difficulties arise from apparently simple and familiar conditions. He will learn that rooms which are pleasing to the eye are not always pleasing in the photograph. The contrasts of light and shadow which do not disturb the eye as it looks around a cheerful room seem harsh and hard in the small area of the print. The masses of transparent shadow which gave rest to the eye in the subject are heavy and lack detail in the print. All these points concern illumination, the first and most difficult of the problems encountered in all interior photography.

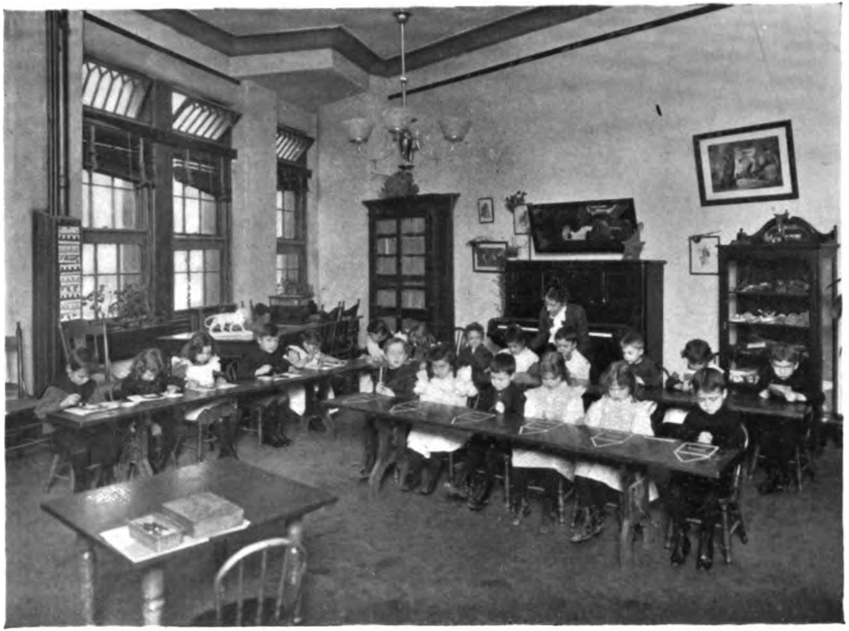
Illumination

Like all other difficulties, the difficulty of illumination or lighting in interiors may be overcome by careful and persistent observation. Personally, I find it a most interesting detail, whether I have the camera with me or not. It will be wise to make a specialty of it, and to familiarize ourselves with the lighting of different rooms, before camera and plate are brought into use. This, as pointed out in THE PHOTO-MINIATURE No. 8, can best be done with an exposure meter or light measurer (actinometer), with which we can make comparative estimates of the strength of the light in various parts of the house. The knowledge so gained will be immensely useful in all interior work.

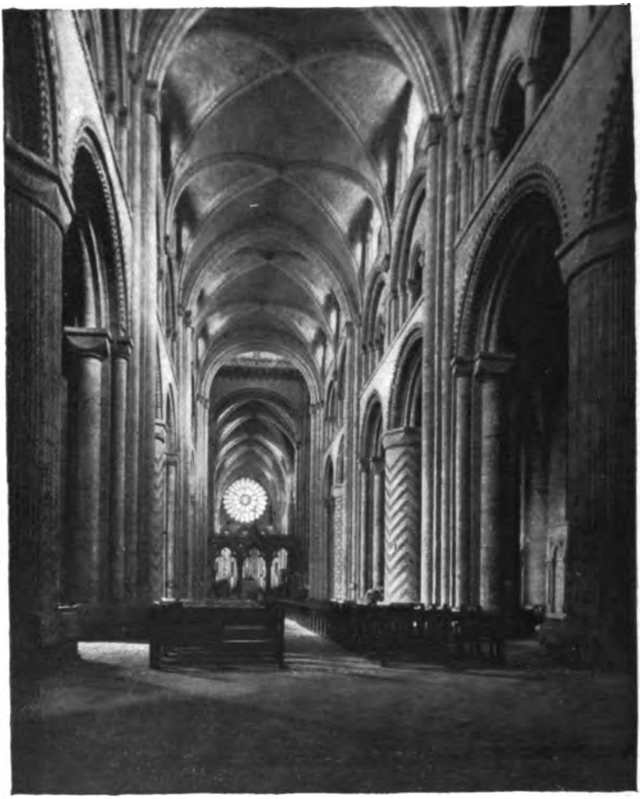
A Simple Actinometer

A simple actinometer or light measurer for this purpose may be made as follows, according to Mr. Alfred Watkins. It is very similar to the one mentioned in *Photography at Home*, but perhaps easier to handle. I quote:

The first procedure is to prepare the sensitive paper for the actinometer. Sensitive bromide paper (as used for enlargements,etc., the slowest brand being the best) should be soaked in a solution of nitrite of potassium (not nitrate), ten grains to an ounce, for five minutes, and dried in a dark place, cut up into strips as long as the paper will allow and ¼ in. wide. A standard painted tint must now be prepared. The paper is exposed to a standard light, and the tint it darkens to is matched with oil or water color for future comparison. If it can be done at a date between the middle of May and middle of July, expose the paper for exactly two seconds to unclouded midday direct sunshine. If this cannot be done, suspend two grains of magnesium ribbon in a coil, and fasten a bit of the sensitive paper exactly 4¼ in. from the center of the coil; then ignite the magnesium, and the paper will be darkened to the standard depth. Mix up (with ultramarine blue, black, and white) a tint of oil or water color to match this darkened paper (it should, of course, be done in a subdued light), and, when matched, paint a piece of brown or opaque paper with the tint. Now to make the actinometer box, in which the sensitive paper is drawn past an aperture, and its darkening compared with a bit of the painted tint alongside. Procure a little tin box of wax vestas (the box of oblong shape, about 1⅞ by 1¼ with rounded edges and corners), such as is sold for 5 cents (1*d*). In the lid punch or bore a ¼-in. hole ½ in. from one end of the lid, and opposite this hole in end of lid make a slit full ¼ in. wide for the strip of



THE KINDERGARTEN: NEW YORK PUBLIC SCHOOL SYSTEM
Pach Bros.



THE NAVE: DURHAM CATHEDRAL
F. W. Morgan

paper to emerge from the box. This slot can be made with two snips of a stout scissors, the bit being bent inwards. Cut a flat slab of cork (from a bottle cork), to fill one half of the box, and to press the emerging strip of paper against the aperture in the lid. Half of the box is left vacant to contain the coiled-up strip of sensitive paper. A bit of the standard painted tint is cemented inside the lid of the box exactly half across the hole in lid. The coiled-up sensitive paper is placed in the box, and the one end brought over the cork pad, when the lid is closed it passes under the opening and out at the slot in end of lid. Through the aperture is seen a semicircle of painted tint, and a semicircle of sensitive paper. The number of seconds required to darken the sensitive paper to match the painted tint gives the value of the light, and forms the basis of the estimate how long to expose. As the corners of the box are not quite light-tight, a strip of black or brown paper, the full depth of the box, should be pasted round inside before putting in the cork pad. If the aperture in the lid is covered with a bit of very pale blue glass cemented on lid, or blue sheet gelatine (as used on crackers), it is an aid in matching the tint. The coil of paper will be in the box most conveniently in a flat position, and make a quarter-twist in passing over the cork pad, which should be cut with a convenient notch to facilitate the bend. So much for the actinometer.

Using the Actinometer

If we expose the actinometer to diffused light (at a window), the sensitive test paper gradually darkens until it matches the standard tint. By noting, with a watch, the time required for the paper to reach the standard tint in color, we get a figure in seconds or minutes which represents the *actinometer time* of the light at that hour and in that place. In this way we measure the intensity of the light. If we compare this actinometer time with the time required to get the standard tint in another place, where there may be more or less light, we get a definite idea of the relative intensity of the light in both places. If, for instance, our first observation gives us the standard tint in six seconds, and a second observation in another room requires twelve minutes to give the tint, we know that the light there is 120 times weaker than at the window where we made the first observation. Hence it follows that if at the window one second is the correct exposure for a certain plate and lens aperture, we must give 120 seconds, or two minutes' exposure, with a plate of the same rapidity and the same lens aperture, in the room where we made the second actinometer test. This shows the usefulness of the actinometer as a light measurer. If we make a tour of the rooms in the house between 11 A. M. and 1 P. M., when the light is fairly constant, the actinometer times given by the tests here and there with the actinometer, will give us a fairly correct idea of the relative exposures needed in each room.

Exposure Meters

These tests with the actinometer are designed merely to make us familiar with comparative light intensities under varying conditions in different interiors. They will not tell us what exposures to give. In order to ascertain this, we must take into account the character of the room and its furnishings, the speed of the plate and the lens aperture used—in addition to the actinometer time. Many photographers have an understanding of these factors sufficient to enable them, by looking at the image on the ground glass, to estimate the exposure required with a considerable degree of accuracy. As a photographer I myself worked on this basis years ago, but since the exposure systems of later years have been introduced, I have found in them a helper better than personal guess work. The exposure meter of the shops, then, furnishes the simplest and most economical way of determining the exposures required by interiors. The Wager Exposure Scale is an instrument of this sort retailing at a moderate cost. The Watkins' Special Indoor Meter is another. In my own interior work I have used the Wynne meter because it combines actinometer and exposure meter in one, giving the light intensity under every possible variation of condition as well as the required exposure. In buying a Wynne meter care should be taken to get the latest pattern and the new sensitive paper and speed list, in all of which important changes have been made during recent months.

The use of such a meter has already been fully explained in THE PHOTO-MINIATURE No. 8. Briefly, it should be placed within the deepest shadow in that portion of the room to be photographed, and facing the light source. By using the lighter of the two "standard tints" we can shorten the experiment. The time taken to darken the sensitive paper so that it matches the standard tint represents the actinometer time—the measure of the light intensity. This factor is applied to the table on the dial of the meter to find the required exposure. The use of an actinometer in this way will give us a practical understanding of illumination indoors more easily and more certainly than any other method within my knowledge. Without some such guide exposure can only be guesswork and our results correspondingly uncertain.

Apart from the use of meters and other helps, the grand rule in photographing interiors is to make sure that the plate is fully exposed. Overexposure can generally be remedied in development, but underexposure can rarely be helped satisfactorily. The range of exposures for a modern room, with soft illumination and light-colored furnishings will vary considerably according to local conditions, extending from 15 seconds to an hour. From this it is apparent that to suggest exposures here would be folly. Hard won experience and judgment or a reliable exposure meter are the only guides available, and of these the latter is always the more certain in results and the least expensive in practice.

Inequality of Illumination

After the question of general indoor illumination and its relation to exposure, we come to the practical difficulty of unequal illumination encountered in all interiors. When we deal with interiors from the pictorial point of view, these inequalities are turned to advantage in composition and chiara-oscuro; but in straightforward interior photography an endeavor is made to "even things up" for the sake of general effect. This can be done in various ways. Thus the lighting of a room varies with every hour of the day, and with the seasons of the year. If we know the house we are working with, our knowledge of its aspect under varying conditions will enable us to choose that time of day or year best suited to the most advantageous view. In the majority of interiors the simple expedient of diffusing the light is sufficient to soften contrasts which would displease the eye in a photograph. This experiment is advised as an excellent object lesson. Expose a plate upon an interior with the sunlight coming in at the windows, taking care not to include any windows in the view. Now screen the windows with thin white muslin or old sheeting, and make a second negative, giving proportionate exposures in each case. The difference in results secured by diffusion will demonstrate its advantage in a forcible way.

Sometimes unequal illumination can be controlled by closing the shades of one or more windows during the larger part of the exposure, and throwing the windows open to the light for a few seconds at the end of the exposure to secure sufficient emphasis of the natural lighting of the room to show its everyday aspect. This is especially advisable in rooms facing the south, where harsh contrasts may be expected.

A great advantage can often be gained by opening or closing doors or portières leading to adjoining rooms. Where small rooms are connected by arched spaces or sliding doors of unusual width an interior showing two or more rooms will often give a pleasing view. At other times a door partly opened, or a drawn portière, giving just a glimpse of another room, will not only add the effect of space, but will also help to equalize the illumination of the room. The illumination of a room is naturally much more easily handled if we choose a point of view which does not include windows. In narrow, long rooms, where we are obliged to photograph against the light, the shadows cast by furniture projecting may be lighted by fixing a white sheet or other reflector to the wall near the window outside of the angle of view. This will receive the light from the window and throw it into the shadows. A light-colored wall serves, of course, as such a reflector.

Where we want to photograph an interior including a difficult window within the angle of view, it may be well to draw the shades of the window completely during the greater part of the exposure, lighting the room by means of a window outside the field of view. If this illumination gives too "contrasty" a lighting, the other shades can be drawn down and propped open at one side to admit light as needed.

Local Lighting

In exceptional cases, where furniture casts large deep masses of shadow which we cannot light by natural means, recourse must be had to the use of magnesium ribbon. A few inches of this, burned behind chairs or other furniture so as to be hidden from the lens, will do wonders with obstinate patches of shadow. I remember a case of this sort. We had to photograph a large room containing much furniture which we were not permitted to move. The walls were of burnished gold and the woodwork was ebony, with a floor of yellow oak. The room was lighted from one end only, which held a large window filled with orange and green tinted glass. The exposure took several hours of two days. After a prolonged exposure to secure the general aspect, we locally illuminated each part of the room separately, using magnesium ribbon especially directed to lighting the masses of non-actinic shadow. It was a work of patience, but the result justified our care, for the photograph showed the room and its subdued illumination in a way closely approximating the visual effect. A few inches of magnesium ribbon, held with a pair of pliers well away from face and eyes, burned over a dust shovel or metal tray so that the burnt waste cannot injure carpets or rugs, will do the work. After each exposure with ribbon the interior must be well aired so that the smoke and dust disappear before further exposure is given.

Choice of Point of View

In interior photography a great deal depends upon the point of view from which the exposure is made. This should be determined by actual study of different views on the ground glass. If a characteristic view can be obtained without including windows so much the better. Backed plates and careful manipulation, however, render us practically independent in this detail. It is always advisable to make two views of a room from different points rather than to attempt to get the whole room in one wide-angle view. A central point will rarely give a satisfactory idea of a room. In all ordinary interiors a larger portion of the floor should be included than is shown of the ceiling. If a broad light falls upon the floor the shades of all the windows should be drawn down a little. The softer the light entering, the better will be the result, although there are interiors which demand a certain amount of force. The height of the camera has much to do with the general appearance of an interior. It is a common fault to place it too high—about 4 feet 6 inches, or, better, 4 feet from the ground is perhaps most favorable to the best result. In many rooms a height of 40 inches will be even better than 4 feet.

Arrangement

Much of the charm of a home interior depends upon its familiar arrangement. In looking back at the old home we remember the place occupied by this or that, and to find a prominent object misplaced—to help the composition—robs an interior of half its pleasure to those who really know the place it pictures. At the same time a certain amount of arrangement is sometimes desirable before an exposure is made. The colors of objects make a difference, and an arrangement which looks desirable to the eye may look "patchy" or "spotty" in a photograph even though an orthochromatic plate be used. Sometimes superfluous pieces of furniture may be removed. It is so easy to get the crowded furniture store appearance in an interior, especially if it is a small room. But as to what is superfluous only those familiar with the room can determine. It is always desirable to include in the view some sign of life or occupancy, such as a bowl of flowers, an open piano with music, a few toys, or a chair drawn to the table near an open book. When only part of a room is included in a view care must be exercised to see that no prominent piece of furniture is cut by the edge of the plate so as to appear inadequately supported. Where this cannot be avoided the object so cut in two should be enveloped in shadow if this is possible, so as to appear less conspicuous. It is well, also, to avoid placing large or dark pieces of furniture near the camera, as this will dwarf the other furniture. Another well advised suggestion, based on the lack of covering power of the older lenses which resulted in dark margins on the plate, is that dark objects should be placed towards the centre of the view, and light objects in the darker places. But all this favors formal arrangement which must be strenuously avoided if our interiors are to possess the spirit of place. With a reasonable care, proper choice of point of view and time of day, and correct exposure, many of these tricks can be avoided.

Reflections

The reflections cast by pictures or mirrors in an interior must not be overlooked. Sometimes these result in an unpleasant patch of light in the photograph, at other times a mirror will give an overcrowded effect to the interior by duplicating several pieces of furniture. This can be avoided by observation before exposure. A slight change in the angle at which pictures are hung, or the placing of a cork, or wad of paper behind one corner, or the moving of a mirror so that unpleasant reflection is obviated, will remedy these troubles. An obstinate mirror can be dulled by "dabbing" the surface uniformly with a piece of painters' putty, but this is troublesome to remove afterwards. It is generally adopted only when a fixed mirror catches a gleam of strong outside light which cannot be controlled.

This minor difficulty becomes more serious when flashlight is used. There would seem to be no certain remedy in this event save the obvious remedy of screening or enclosing the flashlight so as to illuminate the room with a glow of soft light during the exposure.

Focusing

The focusing of an interior requires greater care than is usually given to an outdoor scene, because critical definition is looked for where lines or designs are reproduced. The principal difficulties likely to be encountered are lack of light and unevenness of illumination, making it not an easy matter to get agreeable definition over the whole field of view. In dark interiors, such as we find in stairways, halls, and more often in commercial work and churches, a piece of candle placed or held at different points will facilitate the focusing. In more difficult cases two or three microscopic cover glasses should be cemented to the ground-glass side of the focusing screen with Canada balsam. By using a focusing eyepiece over these places on the screen much detail can be observed which would otherwise be missed.

A Useful Table

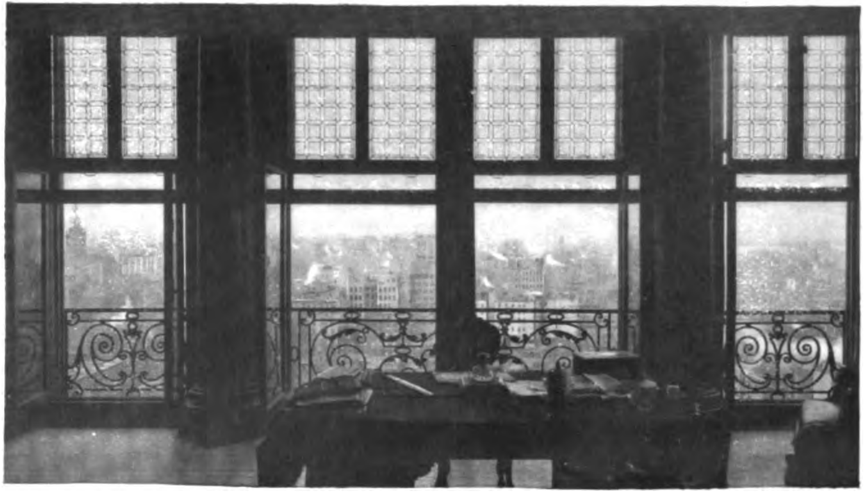
The advice is often given to focus interiors with a large stop in the lens and then insert smaller stops to secure sharpness of definition over the entire field. The difficulty here is to know what particular point in the interior must be focused with the large aperture, so that the smaller stop will cover the nearest and most distant points. When once the smaller stop is inserted, of course, we can see little or nothing on the ground glass.

The subjoined table, first worked out and published by Rev. F. C. Lambert, will be found of considerable assistance when once the method of its use has been grasped. The following explanation, by means of an example or two, will easily make this clear:

Table to Assist Focusing

	5	10	20	50	100	500	INFINITY
5	.	7⅓	8	9	10	10	10
10	..	.	13	16	18	19	20
20	..	...	.	28	33	38	40
50	..	...	..	.	66	91	95
100	..	...	..	..	.	166	185
500	..	...	..	..	..	.	666

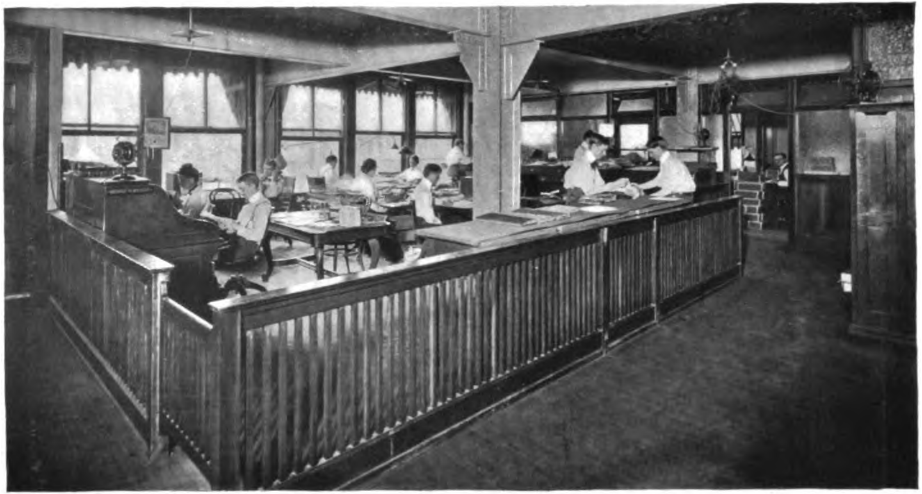
Suppose the nearest object we wish to include in the picture is situated about ten feet away from the camera, and that the most distant object is, say, fifty feet away. Now to get depth of focus sufficient for this case such a small stop will be required that probably very little or nothing will be seen on the ground-glass, and when the open aperture of the lens is used only a very limited area is in anything like sharp focus. But if only we knew what point to focus for with the open aperture of the lens so that when the small stop was inserted the depth of focus would cover the nearest



INTERIOR AND EXTERIOR COMBINED

Giving a glimpse of New York from the Falk Studio, Waldorf-Astoria

B. J. Falk



OFFICE INTERIOR
Flashlight and Daylight Combined
George E. Mellen

and the most distant points, then all would be easy. This is what the table aims to tell us. Glancing along the left-hand column, we see the figure 10. Now run the eye along the corresponding horizontal line of figures until, under 50, on the top line we see the number 16. This tells us that if we focus for an object 16 feet away, and then insert a sufficiently small stop, we shall get the points 10 and 50 feet equally sharp. Thus we may take the left-hand vertical column for the distance of the nearest object, and the horizontal top line of figures for the most distant object. Then the figures at the point where these two columns meet give us the point to focus for, so that the two other points nearest and most distant may be equally sharp with a small stop. Another example: Suppose that the nearest object be 20 feet away, and the most distant be 100 feet away, we see that where the two horizontal and vertical columns meet we have 33 feet as the point to focus for. Thus, according to this table, the old rule of "about one-third" does not hold good. Thus, for two points, 10 and 20, we focus for 13 feet; for 10 and 50, the focus point is 16; for 10 to 100, we aim at 18; for 10 and 500, at 19; and for 10 and infinity we aim at a point 20 feet. Thus the table becomes of service to the *hand-camera* man who wishes to use a small stop to include a certain depth of focus and has no focusing screen. In that case he would simply adjust by the graduated scale for the focus point, and insert a sufficiently small stop. This table gives no hint as to what stop must be used — only the point to focus for without stop.

Gaslight Interiors

The question is sometimes asked: Can I do anything in interior work with gaslight or the electric light supply of the home? The possibilities are interesting, and the experiment will usually repay the trouble involved; but the results can hardly equal those obtainable in a simpler way with flashlight or flashlight and daylight combined. The few really good gaslight interiors I have seen were views of selected portions of rooms. It was obvious that they were works of patience, and the outcome of skill in development and printing. The chief difficulty lies in the restricted area of illumination, and the heaviness and abruptness of the shadows. The prolonged exposure required does not interfere unless we introduce figures, which is not always desired. These difficulties can be overcome in part by local lighting obtained by placing lamps behind chairs or elsewhere out of the field of view. I have sometimes found halation trouble me in such cases, even though my holders were filled with double coated plates.

The exposure for a small room, so lighted, will range from half an hour to three hours, according to the character of the interior and its furnishing. Selected portions of a room, such as part of a wall or a corner, with an open desk, a lady's toilet table, a figure seated at a table, or in an easy chair engaged in some home hobby, will require from twelve to twenty minutes exposure. This presupposes an anastigmat or rapid lens at full aperture and a couple of incandescent gaslights. Similarly a supper table with its snowwhite cloth and dainty setting of glass and china may be attempted if well lighted from above. But these things lead us away from the interior proper.

Flashlight and Daylight Combined

When the conditions of illumination are unsatisfactory and not easily remediable, or when an interior with figures is required, or in the case of difficult commercial interiors, the use of flashlight and daylight combined in a single exposure is advised. This brings us into the field of commercial or industrial interiors where this method is most largely employed. Obviously it can be applied to home interiors with equal advantage.

In this method the interior is really photographed by the flashlight, the daylight serving only to supplement the general lighting of the view, softening the harsh shadows often resulting from the use of flashlight alone, and otherwise helping to give general detail. Mr. George E. Mellen, of Chicago, has done some clever work along these lines, two examples of which illustrate these pages.

To those familiar with flashlight manipulation as outlined in THE PHOTO-MINIATURE No. 29: *Flashlight Photography*—the use of flashlight for interiors will present little or no practical difficulty. Provided that an effective device for screening and diffusing the flashlight can be contrived, the flashlight apparatus with which the reader is most familiar can be used. For the best results, however, the slow magnesium flash given by a blow-through lamp *with a diffusing screen* is preferable. In making the interior of the "Drawing Room Car," engraved elsewhere, Mr. Mellen used a blow-through lamp with ⅛ ounce (60 grains) of magnesium powder in combination with daylight. The lens was Gray's Extreme Angle Periscope, 5 inches focal length, 10 x 12 plate (Lovell's Backed Extra Rapid), and the aperture used was *f*/20. In making the office interior the same equipment was used, except that two blow-through lamps were required, each lamp being charged to its full capacity of ¼ ounce (120 grains) magnesium powder. The lamp or lamps should always be moved far enough to blend the shadows with the lights in the view. A practical drawback to most of the blow-through lamps now in the market (as far as interior work is concerned) is the time required to get the powder all out of the lamp. This often takes so long a period that, with a low ceiling or with the wind in the wrong direction, the smoke comes down within the field of the lens before the exposure has been sufficient to give detail in dark objects or in the shadows. This defect is largely remedied in the new Crown Magazine Lamp made by Folmer & Schwing Co., of New York. This lamp, which retails at a moderate price, deserves mention as decidedly the best lamp available for use with plain magnesium. With two such lamps, arranged with diffusing screens of white transparent material, such as architects' tracing linen, one need not fear for the results in any ordinary interior.

A Diffusing Screen Outfit

To make a diffusing screen outfit such as I have mentioned is not a difficult task, provided the reader does not mind a little trouble. The first requisite is a metal stand, the ordinary folding tripod music stand obtainable from any dealer in musical instruments. The base of this stand is a hollow tube, and the sliding upright rod which supports the music rack is adjustable at any height. To transform this into a flashlight stand and screen, we dispense with all the parts except the folding tripod base. Take this base to any hardware store and get three sections of steel rod, each 2½ feet in length, which will slide within the base of the stand. Next get a piece of steel or iron tubing — narrow gauge gas piping will do — shrunk on to one end of two of the steel rods. This piece of tubing should be 4 inches in length, and so fastened to the steel rod that it will extend 2 inches beyond the length of the rod, thus forming a socket joint 2 inches deep into which the other rod may be fitted and removed at will. Two of the rods having been fitted in this way, the third rod should have a strip of sheet steel welded to it to form the figure T. This strip should be 1 inch wide by 2 feet long, and ¼-inch thick. It should be fastened flat to the top of the rod at the center of the strip, so that a piece 1 foot in length will project at each side of the rod. At either end of the steel strip a hole ⅛-inch in diameter should be drilled, as close to the end as is consistent with strength. Now get four pieces of telegraph or telephone wire, each 2 feet 2 inches in length, and bend up 1 inch at each end. Add four screw eyes and two 1-inch screw hooks, and we can consider the stand ready for the screen.

From a dealer in artists' or draftsman's supplies obtain one and one-half yards of the very best quality of tracing cloth. This should be silky in texture and blue-white in color. The best variety is sufficiently transparent to permit one to read a newspaper placed under it. The width varies with the make, but from 36 to 52 inches wide is advisable for our purpose. We now need two plain wood rollers, which can be had from a dealer in window shades or blinds. These should be 2 inches longer than the width of the tracing cloth already purchased. We also want two strips of wood, 1 inch square, and of the same length as the rollers mentioned above. Now take up the two rollers and put a screw-eye into each end of both; next put a screw-eye at each end of the two square wooden strips, and at the center of each of these latter insert a screw-hook.

Mounting the Screens In order to prevent the tracing cloth screens from tearing away from the roller and square strip, turn down half an inch at either end of the material and bind it with heavy canvas or muslin. Now carefully tack one end of the screen to the wooden roller, just as is done in mounting a window shade or blind, putting a tack at every half-inch along the length of the roller for greater security. Now tack the other end of the screen to one of the square strips, first removing the screw hook from the center and tightly wrapping the material once around the strip, then tacking, and replacing the screw hook at the center. The screen is now ready for use. When not employed it should be rolled up on the roller and tied with tape to keep it in good condition and clean.

The Reflector Procure a piece of strong white muslin or sheeting of the same size as the diffusing screen, and mount it on the remaining roller and square strip precisely as was done with the tracing cloth. This second screen is to be suspended behind the flash light, where it will serve as a reflector, accentuating the flash and protecting near- by objects from the dust and smoke following the ignition of the powder.

Putting the Apparatus Together To assemble the various parts of the stand and set it up ready for use, proceed in the following order. Place the tripod base in position with the folding legs set well apart to give support. Insert rod number one in the hollow upright tube of the base, lower it as far as possible, and fix it firmly by means of the little thumb-screw attached to the upright. Now insert rod number two into the socket joint of rod number one, and place rod number three into the socket joint of rod number two in the same way. This will give a stand of sufficient height for all purposes.

The reflector screen is now taken and attached to the steel T-shaped top of rod number three by inserting the central screw hook of the square wooden end in the hole at one end of the steel strip. Attach the diffusing screen to the other end of the steel strip in the same way. The two screens are supposed to be neatly rolled up and tied. Now take two of the pieces of telephone wire and fix one end of each in the four screw eyes to be found at the ends of the two square wooden strips carrying the screens. Unroll the screens, and fix the two remaining pieces of wire to the four screw eyes at the ends of the two rollers. This will give a rigid and well braced stand carrying the two screens. To raise or lower the screens rod number one is set at any desired position by means of the thumb-screw. When we need a light near the floor, rod number two may be dispensed with, and rod number three should be set in the socket joint of rod number one. Thus we get a stand which will give us a light at any desired height varying from four to nine feet from the floor. The arrangement is as admirable for portraiture as for any other sort of flashlight work indoors.

Adjusting the Lamp

This screen outfit is designed for use with one, two, or three hand lamps, which may be either "magazine" lamps for magnesium powder only, or "open" lamps for explosive compound powders. We will consider the adjustment of a single hand lamp (burning magnesium powder) to the stand, as this will suffice for ordinary home interiors on plates less than 5 x 7 inches.

Procure a thin sheet of steel, or block tin, a little larger than the base of the lamp to be used. Bend up three sides of the sheet about ¼ inch on each side in such a way as to form a clamp over the lamp-base to hold it, and allowing one side of the sheet to remain flat so that the lamp may be removed for hand use at will. On the underside of this sheet have a piece of steel, about 5 inches long, 1 inch wide, and ¼ inch thick, riveted so that one inch of the strip shall project from under the sheet. In this projecting piece, drill a hole just large enough to permit one to slide the metal sheet (or tray) up and down the rods of the flash screen stand. A piece of iron tubing or gas piping, with a thumb-screw introduced at the center, should be fitted to slide up and down the rods of the stand. This, placed on the rod on which the metal tray carrying the lamp is to slide, will enable us to fix the lamp at any desired position on the upright rod without fear of its slipping. The little piece of tubing with the thumbscrew may be about two inches in length, and should be considered as part of the screen stand. If, now, we mount the hand lamp on the metal tray, slide this, held by the projecting strip, on the upright rod number three, and fix it by means of the small piece of tubing just described, we have the lamp adjusted to the stand between the two screens ready for operation. The front of the lamp, of course, should face the diffusing screen. The rubber tubing supplied with the lamp will probably require to be replaced with a longer piece, say seven or eight feet in length, for greater convenience of operation. This attended to, load or charge the lamp and light the alcohol wick according to the instructions given by the maker of the lamp, and we are ready for an exposure.

The arrangement is the suggestion of Mr. J. C. Burnes, who permits me to describe it here for the readers of THE PHOTO-MINIATURE.

To attach a second or third lamp to the stand, where one is insufficient, the same general directions should be followed except that care should be taken to separate the lamps by six or eight inches. Thus one should be placed at each side of the upright rod, and the third lamp in front of the rod, all facing the diffusing screen. The separation of the three lamps can be effected by lengthening the projecting strip of steel under each tray, or by constructing one large tray to hold the three (or two) lamps in their proper place, this large tray being pierced at the center so as to slide up and down the upright rod of the stand.

A Twin Lamp Attachment

To provide for operating two small "open" lamps for compound powders with this screen stand, obtain a sheet of heavy block tin or steel, six inches wide by eighteen inches long. Drill a hole at the center of the sheet just large enough to permit the sheet (or tray) to slide on the upright rod of the stand between the socket joints of each section. This, when in position on the upright rod, may be fixed at any point by the small piece of tubing used with the single lamp bracket. The base pieces of the "open" lamp should be riveted to the tray or bracket, one at each end, and set across the bracket, both facing the diffusing screen. A length of tubing, at least seven feet, should be fitted to each lamp. As it is impracticable to operate two lamps by means of bulbs, we must procure a small bellows to complete the equipment. Any tinsmith will construct a double connection by which the two lengths of tubing can be joined to the bellows. The use of the bellows will offer a threefold advantage, first: to secure greater air pressure which will spray the compound well up into the flame; second: to operate both lamps simultaneously; and third: to ignite the powder with the foot, thus leaving both hands free. In practice, of course, the bellows is placed on the floor at a point convenient to the camera. A steel spring should be fixed between the handles of the bellows for obvious reasons.

In mounting the "open" lamps using compound powders the bracket must always be so placed that the pans containing the compound shall face the diffusing screen, and the alcohol wicks (or igniters) when reversed will turn toward the rear or reflecting screen. The lamps should be placed at a height of about one foot above the bottom of the diffusing screen. Whether "open" or magazine lamps are used the reflecting screen at the rear should be well dampened before use, to prevent flying particles of powder from burning holes in it, and also as a safeguard against fire. Proper precautions against chance ignition of diffusing or rear screen should be made if it be thought that the lamps are too near the igniters or flash. These precautions will suggest themselves. Properly constructed and adjusted to suit the lamps to be used, the screen arrangement here suggested should be absolutely safe in the hands of an intelligent worker.

Using the Apparatus

The screen stand should ordinarily be placed above and about one foot behind the camera, and three or four feet to the right or left, the distance depending on the angle of light desired. For each foot that the stand is moved from the camera it should be turned or pointed to face the principal object in the view. Let us recapitulate the procedure. The stand is set up with the screens rolled up in their place. We take a position behind the stand and turn it until the forward arm of the T-shaped top points toward the center of the view desired. The screens are unrolled, the lamps are charged and the igniters or wicks are turned to the rear and lighted according to the instructions issued by the maker of the lamps. The bellows is placed convenient to the camera. When everything is ready, draw the slide of the plate-holder, open the lens shutter, and press the bellows with the foot. Immediately after the exposure close the shutter, replace the slide in the plate-holder and extinguish the burners on the lamps. Roll up the diffusing screen, open the doors or windows to permit the smoke to escape and—prepare for the next exposure.

With this diffusing screen stand we work with a diffused light, so that we are sure of soft lightings, absence of harsh shadows and reflections of any kind. It is a little more troublesome in the beginning than the direct flashlight system described in the last number of THE PHOTO-MINIATURE, but for interior work its advantages are many and obvious. If fitted with three lamps it will be equally useful for small home interiors or the more difficult work which falls to commercial photographers.

The Amount of Powder

In all this discussion of flashlight and flashlight with daylight for interior photography, I am presuming that the reader has read THE PHOTO-MINIATURE No. 29; or is already more or less familiar with the handling of flashlight powders and apparatus. This understanding is necessary to successful work.

With regard to the amount of flashlight powder to be used it is practically impossible to give definite instructions, as so many conflicting or modifying circumstances must be considered in dealing with different interiors. The lens aperture used, the speed of the plate, the nature of the interior, size and general character, color, etc., and the amount of detail desired are the factors to be chiefly considered. Familiarity with the flashlight apparatus and powder and experience must therefore guide the worker in charging his lamps, or deciding how many lamps will be required in each case. With this knowledge and the hints here given no difficulty should be experienced in handling home or commercial interiors.

If plain magnesium powder is used in a magazine lamp the charge will vary from 20 grains of powder to 120 grains, according to the interior and the capacity of the lamp. The charges used by Mr. Mellen in making the illustrations credited to him will be helpful in this.

When "open" lamps are used with compound flash powder the table given by the manufacturer of the lamp will be the most reliable guide as to the amount of powder needed. The following table may serve as an average. It is constructed for use with *Luxo*, but will also serve for *S. and M.*, *Sunlight*, and *Eastman's* compound powders.

Amount of Powder Required with "Open" Lamps—For Interiors

With an ordinary lens and plates of ordinary rapidity

Distance of principal object	Furnishings of Interior	Amount of powder for each lamp
For 6 feet	Light Walls	½ teaspoonful
For 6 feet	Dark Walls	¾ teaspoonful
For 10 feet	Light Walls	1 even teaspoonful
For 10 feet	Dark Walls	1 heaping teaspoonful
For 15 feet	Light Walls	2 even teaspoonsful
For 15 feet	Dark Walls	2 heaping teaspoonsful
For 20 feet	Light Walls	3 even teaspoonsful
For 20 feet	Dark Walls	3½ teaspoonsful
For 25 feet	Light Walls	4 teaspoonsful
For 25 feet	Dark Walls	5 teaspoonsful

The measures are given in teaspoonsful because this is almost universally used for measuring flash powders.

Interior and Exterior Combined

Where an interior has an attractive outdoor aspect, as when a window overlooks a garden, a pleasing view showing the interior *and* the outdoor scene may be secured by combining daylight and flashlight exposures on the same plate. This may be done by making the flashlight exposure of the interior at night, and leaving the camera (lens covered and plate-holder closed) undisturbed until the following morning, when, from the same spot, and on the same plate, a very brief (second) exposure is given to secure the view seen from the window, which latter should be opened for the moment. It is obvious that, in attempting such a picture, the windows of the room should be opened after the flash-exposure to clear the room of smoke, and the room itself should be locked over night to insure that the camera shall not be disturbed.

Church Interiors

The photographing of church interiors opens up a field which should have a volume for its proper consideration. It is certainly too vast a subject to be handled in the few pages left to me here. Moreover the great difference between American and European ecclesiastical interiors makes it quite impossible to discuss them together. I will therefore content myself with a few hints covering more especially the church interior as we find it in this country. To those who are blessed with opportunities for photographing the architectural glories of Britain and continental Europe, I recommend a diligent study of that profitable little "Handbook of Gothic Architecture," written by Thomas Perkins, from which may be gained that knowledge of the field essential to a true appreciation of its possibilities.

The American church interior presents peculiar difficulties. It is often cramped and mean in its proportions, and where we have breadth there is an absence of that depth and height which we naturally look for in a building devoted to so noble an end as public worship. In our cities we economize space by building one church above another on the same foundation. This gives an upper church for solemn functions, and a lower church for everyday use. In country places our churches are necessarily small, and usually remarkable for their bareness and simplicity. So that in town or country we will rarely find a church interior worth photographing for its own sake, although many are interesting because of personal or historical associations.

Technical Details

In spite of all this, our church interiors will abundantly repay the time and labor involved in any attempt to photograph them. For work of this kind a plate not less than 6½ x 8½ inches is desirable, and the lens should be a medium rather than a wide-angle. The plate should, of course, be protected against halation, and the camera should be provided with vertical and lateral moving front-board, and swing-back movement. Focusing will usually require the aid of a focusing eyepiece, as described on a preceding page, and Lambert's table will be extremely useful. In taking a general view the common mistake of selecting the center of the nave as the point of view should be avoided. It is better to show more of one side of the church than the other, which is easily accomplished by choosing a point of view slightly to the right or left of the center of the interior. Views of side aisles, transepts or of the sanctuary or chancel are oftentimes more acceptable than a general view. If stained-glass windows come directly within the field of view an orthochromatic plate should be used. The best time of day or year for photographing the interior of a church can only be determined by a knowledge of the church and its position. The rule that churches shall face east and west is, in this country, more honored in the breach than in the observance. It is hardly possible to photograph a church interior on sunny days; a sky filled with luminous white clouds is most favorable. Sometimes a dull day offers advantages, especially in photographing interiors newly decorated, and a winter's day with snow upon the ground is peculiarly favorable for an interior with a dark, heavily timbered roof. A church interior with walls and roof light in tone and woodwork darkened by age, such as we often find in the old parishes, will require all our skill and patience. It is well, if practicable, to shade the lens in such an event, so that the darker half of the subject shall receive more light than the upper and lighter-colored half. Where this is not possible the interior should have a generous exposure to get detail in the darker portions, and the plate should be held back (as far as the lighter portion of the subject is concerned) by the local use of bromide solution in development. At other times we can take advantage of the position of the sun, or the direction of the light at a certain hour, in order to harmonize undesirable contrasts in the subject.

Apart from these technical details, and perhaps of more importance, every effort should be made to get the spirit of the place into the photograph. In all church interiors there is a sense of repose, peace, mystery, and unless the photograph embodies something of these qualities it cannot be regarded as a satisfying interpretation of the place. It is largely a matter of lighting, the disposition of the shadows and the balance of the parts. A little care and observation will give us both the feeling and the skill necessary for success.

Developing Negatives

A few hints on the developing of negatives of interiors may fittingly close this monograph. This will require all the patience and skill we possess. Some subjects require softness and detail; others may demand breadth, according to the general effect desired; very rarely will we seek brilliancy or vigor in our interior negatives. The developer given by Mr. Waters in THE PHOTO-MINIATURE No. 29, is one which is peculiarly suitable for interior work. Mr. Mellen, with a remarkable record for interiors behind him, uses the pyro developer given on page 37 of his "New Pointers for Amateurs in Photography," varying the quantities of solutions No. 1 and 2 and adding more or less water, according to the result desired or the necessities of the exposure. My own experience with this formula justifies its praise here. As a general rule, whatever developer is used, the development of interior negatives should begin with the normal developer diluted with three or four times its bulk of water. Local restraint of overexposed portions with diluted potassium bromide solution, or local acceleration with a fairly strong solution of caustic alkali, applied in both cases with a camels'-hair brush and discrimination, will be indicated as the image progresses towards density. In cases of overexposure, where the negative has abundant detail and is inclined to overmuch softness, the plate should be underdeveloped and afterwards intensified to get the desired printing strength and clearness. When underexposure is indicated, if slight, dilute the developer liberally, or mix up a new combination still diluted but stronger in alkali than in reducing agent, and give the negative plenty of time in this. If severe underexposure is indicated develop for as much detail as can be obtained without veil or fog and, if this is too faint for successful intensification, make a transparency by lamplight, and from this transparency get a second negative in the development of which the strength or density desired may be secured. When the subject is accessible, however, it is the part of wisdom to put the underexposed interior negative in the waste barrel and begin anew "with a firm purpose of amendment"—as we are taught elsewhere.

BOOKS

Architectural photography. By G. A. T. Middleton. 1898. Chapters collected from *The Amateur Photographer*, including a chapter on church interiors. (English) 50 cents.

Exterior and Interior Photography. By F. W. Mills. 1894. Contents: Apparatus — Light and Color — Exposures of Interiors — Exposures of Exteriors — Development — Intensification of Negatives — Platinotype Process — Bromide Printing — Autotype Printing on Gelatino-chloride Paper — Mounting Prints — Appendix. Illustrated. (English) $1.50.

ANTI-TRUST

PURE
COLLODION
PAPERS

MONARCH MATTE

MONARCH

MONARCH GLACE

TRADE MARK

RELIABLE
UNIFORM
PERMANENT

Three times quicker printing than any other

Prices same as other Collodion Papers

MANUFACTURED ONLY BY THE

MONARCH PAPER COMPANY

E. & H. T. ANTHONY & CO.
SOLE TRADE AGENTS
122-124 Fifth Avenue : NEW YORK

ANTI-TRUST

Kindly mention THE PHOTO-MINIATURE

NOTES

The photographic event of the month was the Second Chicago Salon, held at the Art Institute, Chicago, October 1–22. According to the official *Souvenir of the Salon* nearly one thousand frames were submitted to the jury of selection, and out of that number 129 photographs, representing 58 exhibitors, were accepted and hung on the walls of the Institute. The general character of the exhibits may be judged by the careful reproductions given in the *Souvenir*, and from these reproductions we draw the inference that the second Salon was in no way less interesting or less attractive than that held last year. The verdict of those present at the formal opening was that pictorially this year's show was an advance upon the First Salon of 1900. We learn that the judges, Messrs. Henry Troth, Wm. B. Dyer, J. H. Vanderpoel, C. F. Browne, and Wm. Schmetdgen, faithfully endeavored to maintain the high standard set by the First Salon, and that they were practically unanimous in what they accepted and rejected.

The sombreness of the majority of the exhibits was perhaps the only general feature unfavorably commented upon. The tendency to run to low tones and "sad effects" is not natural to American workers, and when it becomes known that the leaders in pictorial photography abroad have abandoned this peculiarity, doubtless there will be a change for the better on this side of the Atlantic.

The absence of exhibits by those Eastern workers who took so prominent a part in the management of the First Salon was noticeable, and many reasons were advanced for the apparent lack of sympathy or support.

The list of exhibitors is as follows: C. Yarnall Abbott (4); Laura Adams (3); Prescott Adamson (1); H. A. Beasley (1); Arthur E. Becker (6); E. M. Blaine

CRAMER'S
Isochromatic
Plates

ARE THE MOST PERFECT COLOR-SENSITIVE PLATES ON THE MARKET

◆

Made in Three Grades of Speed:
SLOW, MEDIUM and
INSTANTANEOUS

◆

For Sale by all Dealers in Photographic Supplies

◆

Manufactured by

G. Cramer Dry Plate Co.
ST. LOUIS, MO.

OFFICES IN
NEW YORK, No. 32 East 10th Street
CHICAGO, Room 705, Cable Building
SAN FRANCISCO, Room 38, No. 819 Market Street

Use Mallinckrodt's Sodium Sulphite Anhydrous
Absolutely Pure for Photographic Purposes

(2); Edward LaVelle Bourke (4); Elizabeth Brownell (2); Mrs. E. P. Cabot (2); S. Hudson Chapman (3); Essie Collins (1); F. S. Crowell (1); Dr. M. H. Cryer (1); F. Holland Day (7); Dr. F. Detlemsen (3); Miss Mary Devens (3); Charles E. Denitz (1); William B. Dyer (6); J. H. Field (4); L. S. Gans (1); Arnold Genthe (1); A. A. Gleason (1); Frank Green (1); W. P. Gunthorp (1); Geo. H. Hazlitt (2); S. S. Hornor (2); Chas. K. Huguet (1); W. F. James (2); H. Knutzen (2); Geo. F. Kunz (1); Louis A. Lamb (2); Francis Watts Lee (4); C. H. McDowell (1); Oscar Maurer (1); Geo. C. Meeker (1); F. E. Monteverde (2); J. Ridgway Moore (3); M. McNaughton (3); W. L. Page (1); J. D. Palmer (1); H. B. Parker (1); W. B. Post (2); Dr. D. Power (2); Miss V. M. Prall (6); G. R. Reilly (2); Mrs. W. E. Russell (1); Mrs. E. V. Schutze (4); W. A. Scott (3); Mrs. S. C. Sears (2); Frank Snyder (1); Edmund Stirling (2); M. J. Street (1); Henry Troth (6); F. J. Von Rapp (2); G. K. White (1); M. L. Whitson (1); Mrs. M. A. Wiggins (1); A. W. Wilde (1); H. S. Williams (1); J. B. Yarwell (1).

❧

A novel and commendable enterprise inaugurated for the benefit of amateur photographers residing in New York and its vicinity is the circulating Photographic Library of Henry Kahn & Co., 189 Broadway, New York. This library contains all the standard works on photography at present obtainable. Subscribers are permitted to have the use of any book for a period not exceeding seven days, the subscription fee of $1 per year being merely a nominal charge. A reading room is provided for those who wish to consult books without taking them to their homes. New books are to be added as published. A pamphlet describing the library, its books and facilities may be had on application to Messrs. Kahn & Co.

❧

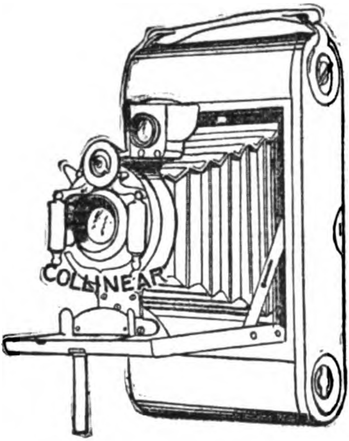
Mr. F. Dundas Todd has compiled and published an attractive portfolio comprising 58 halftone engravings

THE COLLINEAR

SERIES II. F 5/6

can now be fitted to the

POCKET FOLDING KODAK No. 3



No. 3 Pocket Folding Kodak, with **COLLINEAR II, No. 2** and Unicum Shutter . . . $62.00.

COLLINEAR LENS and Shutter only . . . $48.00.

COLLINEAR, Series III, fits

	LENS AND SHUTTER
No. 2 Folding Pocket Kodak	$38.00
No. 3 " " "	$38.00
	LENS
No. 3 Cartridge Kodak	$40.00
No. 4 " "	$40.00
No. 5 " "	$50.00

A COLLINEAR, Series III
doubles the speed of your Kodak
COLLINEAR, Series II
quadruples it.

Sold by all dealers at uniform prices. For descriptive circular C, write to

VOIGTLAENDER & SON OPTICAL CO.
137 West 23d Street : New York

from as many selected prints accepted by the Second Chicago Salon recently held in that city. The 58 reproductions represent a single example of the work of every exhibitor at the Salon, and the *Salon Souvenir* is therefore a valuable record of the work of these exhibitors. The book, which is printed on heavy-coated paper and securely bound in stiff paper covers of tasteful design, may be had for fifty cents, postfree. We have obtained a limited supply, which readers of THE PHOTO-MINIATURE can secure by remitting the price of the *Souvenir* to Tennant & Ward, 287 Fourth Avenue, New York.

❧

The proverbial "long felt want" has again been supplied by Mr. U. Nehring, in the shape of a handy little Focusing Finder which, attached to any folding hand camera, renders the ground glass and the operation of focusing unnecessary. The image given by this finder is not inverted, and as the finder must be of the same focal length as the lens with which it is used, it practically converts the camera into a twin lens instrument. Full particulars can be had from Mr. Nehring.

❧

In answer to many correspondents, we desire to announce that *Photograms of the Year 1901* will be issued in London late in October, and a shipment should be ready for delivery in America about December 1, possibly earlier. The price of the book remains unaltered, viz.: paper covers, $1, postfree; in substantial cloth binding, $1.25, postfree. In its general arrangement and make-up the new volume will follow the lines of the issues of the past six years, with a few alterations and added features. It is the intention of the compilers to make the work more than ever a worthy representation of the progress and position of pictorial photography during the current year.

As in previous years, *Photograms of the Year* will represent modern photography as painting and sculpture are represented by *Royal Academy Pictures* and similar annuals. The volume will consist of about two hun-

THE PERFECTION OF SEED'S DRY PLATES AND SODAS DEMONSTRATED IN AN UNPARALELLED RECORD

New York, N. Y., Sept. 26, 1901

M. A. Seed Dry Plate Co.

Gentlemen:—I have just returned from a seven months' trip through Egypt, Palestine, Turkey, Italy, Switzerland, Holland and other parts of the old world, and during the trip exposed 1600 Seed's No. 26x plates, and desire to state that the same have been developed and show exquisite results, without the loss of a single negative, either in packing or developing.

I would also state that in developing the plates I used the Seed's Chemically Pure Sulphite and Carbonate of Soda, and to my mind they are simply perfection, both the plates and the Sodas; it is also an interesting fact that these plates were not developed until my arrival home in New York. Next month I will complete my twenty-seventh year as an amateur photographer.

The above plates were six weeks on mule back, and the separators, used by the Seed Company in packing their plates, acted so perfectly that the plates did not in one instance rub or break, and I find that the packing is not only safe, but is also very convenient.

Yours Truly,
D. L. ELMENDORF

M. A. Seed Dry Plate Co.

St. Louis, Mo.
2005 Lucas Place

New York, N. Y.
57 East 9th Street

dred pages, super royal 8vo (9¾ x 6½), including about one hundred and thirty illustrations. The paper used will be super-calendered, specially manufactured to give the best possible rendering of the half-tone illustrations.

The illustrations will be reproductions of selected pictures from the principal exhibitions of the year, as well as a number of non-exhibited pictures by some of the best known amateur and professional workers in the world, specially contributed.

The principal critique will again be written by A. C. R. Carter, and will chiefly deal with the exhibitions of the Royal Photographic Society and the Salon, and with non-exhibited British pictures. Minor critiques, dealing with the work in the Colonies and in foreign countries, will be contributed by able men; and the editors and staff of *The Photogram* will supervise the whole work. A detailed account of the remarkable collection of photographs shown at the recent International Exposition at Glasgow will be an interesting feature.

The American school will be described and pictured in a catholic article, which will deal in a clear and comprehensive manner with what is perhaps the most interesting and most debated of "schools" of photography.

There will be discriminating notes on the French and German schools, and on the work of Canada, Australasia, and India.

◆

There are signs of a revival of interest in the tinting of portraits, and we have many inquiries for books dealing with this subject. Of these manuals Bool's "Art of Photographic Painting," and Neville's "Photographic Colorist" are perhaps the most useful for beginners.

The tinting of portraits is often described as an abomination, and the cheaper varieties of colored photography sustain the justice of the phrase, but carefully and skilfully done, it is often possible to give a desirable touch of color to a print specially prepared for the purpose. The Acme Transparent Water Colors, made by the Acme Water Color Co., 90 Wabash Ave., Chicago, can be recommended as possessing desirable

To attain success in Photography it is necessary to select a good camera and shutter and suitable plates, films, etc., but practically everything depends upon the lens.

For adaptation to either old or new Cameras

ROSS

LIMITED

Offer to amateur or professional photographers and process workers a greater choice and a finer selection of high-class lenses than any other manufacturer in the world.

IMPORTANT NOTICE

The Zeiss and Goerz Patent Anastigmatic Lenses are manufactured (under License) by ROSS, Ltd., at their Optical Works, Clapham Common, *exactly to formulas supplied by the patentees*; and the optical glasses and methods of construction are precisely similar to those employed by them, the only difference between the respective lenses being that the Anastigmats made by ROSS, Ltd., are mounted in the English style, and furnished with the Standard apertures of the Royal Photographic Society.

ROSS, LTD.

111 New Bond Street : : LONDON, W., ENGLAND

Sold by all Leading Dealers

Kindly mention THE PHOTO-MINIATURE

qualities for this work. A descriptive booklet will be mailed on application to those mentioning THE PHOTO-MINIATURE.

◆

Messrs. Geo. K. Hazlitt & Co., Chicago, send to our table a useful little volume titled, " Improving the Negative," by Henry G. Abbott. It deals chiefly with intensification, reduction, and spotting of negatives, and is well worth its price, 25 cents.

◆

A series of practical papers on *The Composition of a Developer*, by François Voitier, is being published in *The Camera*, Philadelphia. Mr. Voitier deals with his interesting subject in a direct and helpful way, and his papers form a useful addition to the literature of development. The papers on *The Lens* appearing in this journal, written, we believe, by Mr. John Bartlett, should not be overlooked as abounding in plain and practical explanations touching many points about the lens which should be better understood.

◆

A Rotary Trimmer, with double renewable knife and other special features, has been put on the market by Walsh & Many, Cleveland, Ohio. The Handy Form Holder made by this house is another useful helper in trimming prints. Illustrated circulars may be had on request.

◆

The California Camera Club announces that in conjunction with the San Francisco Art Association, the Second San Francisco Photographic Salon will be held in the galleries of the Mark Hopkins Institute of Art in the city of San Francisco, beginning January 9, 1902, and continuing two weeks.

The object of this Salon is to exhibit that class of photographic work which shall best exemplify artistic feeling and execution, without regard to particular schools or fads; the pictures will be selected by a com-

LEADING
DEVELOPERS

METOL The quickest and most energetic of developer
Oz., 75c.; lb., $10

ADUROL Best for intensity and contrast
Oz., 60c.; lb., $8.50

ORTOL Clear and free from fogging; excellent for developing papers
Oz., 75c.; lb., $10

PYROL Improved form of Pyrogallol, clean, compact, easy to handle
Oz., 30c.; lb., $4

HAUFF

◆

G. GENNERT
Trade Agent
NEW YORK

Kindly mention The Photo-Miniature

petent committee of artists and photographers appointed by the San Francisco Art Association and the California Camera Club.

Exhibitors of pictures which have been hung in other salons and exhibitions are specially invited to contribute.

RULES AND REGULATIONS

All pictures must be either framed or matted under glass.

All transportation charges must be paid by exhibitor. An exception to this rule will be made in the case of foreign contributors, who may send their pictures unmounted if they so desire, the management undertaking to suitably mount those selected, and to return the entire contribution after the exhibition, free of expense.

No prizes will be awarded, nor will any fee be demanded of exhibitors.

The title, the exhibitor's name and address, and if for sale, the price, must be written on the label provided, and attached to the back of each picture. Nothing shall appear on the front of the picture except its title and maker's name.

Each picture submitted must be entirely the work of the exhibitor. Pictures will not be received bearing the names of firms or galleries.

All pictures submitted for exhibition must be addressed "San Francisco Photographic Salon, Mark Hopkins Institute of Art, San Francisco, California," and forwarded at owner's risk, charges prepaid, and delivered at the Institute not later than December 10, 1901.

From the price of any pictures sold during the exhibition ten per cent will be deducted.

No picture shall be removed from the gallery until after the close of the exhibition.

The management will not be responsible for any loss or damage that may occur; at the same time, all possible care will be taken to prevent any.

To each contributor whose work has been accepted a catalogue will be mailed as a notification of such acceptance.

Bausch & Lomb

PLASTIGMAT f/6.8

The Perfect Photo Lens

Plastigmat *f*/6.8 represents the latest and highest achievements of the optician's art. It was designed with all the requirements of photography—pictorial, mechanical and optical—in view, and it meets the requirements.

It is a symmetrical anastigmat of longer focus than those heretofore produced, giving superior pictorial effect. It can be fitted to any camera and takes any shutter between its combinations. The anastigmatic and other corrections are perfect, and its speed is all that is required.

The single combinations are free from astigmatism and give pictures twice the size at same distance, or same size at twice the distance, at snapshot speed.

There is no symmetrical anastigmat equal to it

SPECIMEN PICTURES ON REQUEST

Bausch & Lomb Optical Co.

NEW YORK : ROCHESTER, N. Y. : CHICAGO

Manufacturers of the World-Famous
BAUSCH & LOMB ZEISS ANASTIGMAT LENSES
in Seven Series

Catalog Free

All communications must be addressed to the Executive Committee of the San Francisco Photographic Salon for 1902, 819 Market Street, San Francisco.

❧

Catalogues Received. Messrs. Ross, Ltd., London, send to our table a new and revised edition of their "Photographic Catalogue, 1901," a substantial book of 130 pages, 7x10, giving detailed particulars of their latest specialties, and attractively illustrated with a bromide print and several half-tone engravings. The sections of the catalogue embrace illustrated lists of the new Ross lenses, including the Extra Rapid Symmetric Anastigmats; Ross-Zeiss lenses, telephoto combinations, prisms, etc.; Ross-Goerz anastigmats and Anschutz cameras; exposure shutters, isochromatic screens, exposure meters; Ross cameras, outfits for process work, and optical lanterns. A few copies of the abridged 1901 list accompany this general catalogue. These we will gladly send to any one interested on application. Requests for the general catalogue mentioned above should be addressed to Ross, Ltd., 111 New Bond St., London W., England.

Zimmerman Bros., St. Paul, Duluth and Sioux City, send us a new catalogue of 240 pages, attractively setting forth their specialties and extensive stock of apparatus and material. We note that this catalogue was printed at the private press of Messrs. Zimmerman Bros., and commend its typographical arrangement and general interest. Copies can be had by addressing the firm at St. Paul, Minn.

Another bulky catalogue and reference book comes to us from the enterprising house of Mullett Bros. Photo Supply Company, Kansas City, Mo. This is an attractive volume, well printed and profusely illustrated. Among other interesting items we note a list of 150 photographic books and magazines, embodying the best of current photographic literature. The list is one which should be kept on file by all progressive photographic workers.

Mr. E. B. Meyrowitz, 104 East 23d Street, New York, the American agent for Carl Zeiss & Co., of

Trade Mark

Actien-Gesellschaft für Anilin-Fabrikation, Berlin S. O.
Photographic Department

Manufacturers of the patented

Agfa-Intensifier. Name protected.

The One Solution Intensifier.

Agfa-Intensifier is a clear, colorless solution, which for use is diluted 1 part with 9 parts of water. In this the negative to be intensified is immersed, and intensification commences immediately, continuing for about 10-15 minutes, when the process is complete and the plate must be withdrawn to avoid veiling.

Agfa-Intensifier does not stain, and the whole process is absolutely complete in the one manipulation; it only remains to wash the negative.

Of all dealers.

2 oz.	4 oz.	8 oz.	16 oz.
$ 0.35	$0.60	$1.00	$1.75

Testimonials.

Mr. Jacob Schloss, New York, writes: Gentlemen: I have tried your "Agfa"-Strengthener and find it works splendidly, far better than the old time Mercury and Ammonia or Soda, and shall continue it.

Mr. F. W. Guérin, St. Louis, Mo., writes as follows: Gentlemen: Replying to yours of the 12th inst., the Intensifier is all right. I had been using the intensifier some time before you sent me that sample.

Agfa-Reducer. Name protected. Patented.

"A novel and simple process of Reduction for Plates, Slides, or Bromide Papers."

"Always ready for use, and instantly prepared."

Only to be dissolved in 10 parts of water.

Complete reduction takes about five minutes.

Of all Dealers.

$0.80 per original bottle of 4 oz. with screw-lid and hollow glass-stopper, serving as measure.

$1 per box of ten glass-tubes containing ten grams each.

EIKONOGEN ★ AMIDOL

RODINAL ★ DIOGEN

★ IMOGEN ★

Jena, favors us with a copy of the new American catalogue of the Zeiss photographic objectives. This is a sumptuous list of 126 pages, printed on heavy wood-cut paper and tastefully bound in cloth. The illustrations include many fine halftone engravings and a collotype supplement. The text comprises full particulars and prices of the Zeiss standard lens mounts, the Planar, Protar, Doppel-Protar, and Unar lenses, and the Zeiss telephoto combinations. The distribution of the catalogue is restricted to dealers in photographic supplies, by reason of its cost. It is, without doubt, one of the most valuable of photo-optical lists, and the dealer can obtain from its pages much lens information of practical assistance in the sale of photographic lenses.

◆

The Photo Mirror, a little monthly journal published by H. A. Hyatt, of St. Louis, Mo., at 50 cents per year, lives up to its title in an admirable way, reflecting innumerable items of interest in every issue, and making itself an indispensable helper to the progressive photographer. We note with pleasure its growth and improvement since the publication of the first issue a few months ago.

◆

"The Photographic Lens" is the title of an interesting and profusely illustrated paper published in *The American Inventor* of October 15. The article sets forth, in a simple and direct way, what the lens is, how it acts, and some of the difficulties in the way of making a perfect lens.

The American Inventor, by the way, has been much improved in make-up since we last saw it, and is to-day one of the brightest and best of the journals covering the field of American inventions in a popular way. [The American Inventor Pub. Co., Washington, D. C. Per year, $1.]

◆

The movement toward a Professional Photographers' Association in England, led by Mr. Thomas Bedding,

$610 *Cash Competition*

WITH GRAND PRIZE OF $200 IN CASH

for Prints on

"ROTOGRAPH"

Bromide Paper

Send 2-cent stamp for particulars of Competition, or

Better still

Send 10 cents for sample package of "Rotograph" Paper, circular of Competition and copy of our new magazine

"The Bromide Monthly"

* *

"ROTOGRAPH"

B. RUSSEGER
E. S. MAPES } *Selling Agents*

101 Fifth Ave., New York

Kindly mention THE PHOTO-MINIATURE

editor of *The British Journal of Photography*, has thus far been most successful when the apathy of professional workers in the matter of organization is considered. Although organized barely four months ago, this association now numbers over 500 members, the roll including many of Britain's most prominent photographers. We are glad to note this progress. The present position of the American professional photographer is largely due to the help derived from his State and National organizations, and British photographers will speedily discover the practical advantages of fraternal union. Mr. Bedding and his co-workers deserve the enthusiastic support of all who are interested in the future of professional photography in Great Britain.

Speaking of professional organizations, we note from a recent issue of the *Deutscher Photographen-Zeitung* that the Deutscher Photographen-Verein, which was organized in 1876 with 35 members, has to-day a membership of over 800 professional workers. Although we have not the exact figures, we believe that the membership of the Professional Photographers Association of America just exceeded 800 at the convention recently held at Detroit.

◆

The Photographic Salon (London), opened September 20 at the Dudley Gallery, Piccadilly, is spoken of as a better and more interesting show than any of its predecessors. According to *The British Journal of Photography:* "There is a distinct improvement in the spirit as well as in the quality of the work exhibited." The exhibits number 284, most of them small in size, less than forty having an area of one square foot. The journal goes on to say: We are glad to say that we left the gallery without the usual impression that the bulk of the exhibitors existed in a world full of gloom and misery. Possibly, on the other hand, there is a tendency towards frivolity, but the change is certainly for the better. It is gratifying to find that the dainty and graceful methods which we have been accustomed to associate with the names of Demachy, Puyo, and a few others, have had so wide an influence. Some of the most pleasing

LOVELL
COLOR DIFFERENTIATING
PLATES

Positively the best orthochromatic plates in the market. Sensitive to the entire spectrum, giving brilliant negatives; simple in manipulation.

May be had "backed" on request in two speeds
C. D. "FAST" and C. D. "MEDIUM"

OBTAINABLE FROM DEALERS OR DIRECT FROM FACTORY
SEND FOR PRICE-LIST AND SPECIAL CIRCULAR

LOVELL DRY PLATE MFG. CO.
NEW ROCHELLE, N. Y.

Denver: Hart Bros. & Wells
Western Depot: 64 Wabash Avenue, Chicago
Kindly mention The Photo-Miniature

work would be practically impossible with a less plastic printing process than gum bichromate, and it is evident that this process, its possibilities and limitations, are becoming much more generally understood. Dr. Henneberg is still the leading exponent of the process on a bold scale. We have had opportunities of following his work through some of its experimental stages, and have the opportunity of viewing his productions now that he has obtained mastery over his medium. To say that he has reached finality would be absurd, but it is quite evident that, in his hands, the process, in addition to these exclusively its own, lacks none of those qualities which the ordinary carbon process possesses. . . .

"Both Demachy and Puyo are amongst the largest contributors as regards numbers of frames, and, needless to say, their work materially adds to the attraction of the exhibition. American photographers are also largely represented, but there is a notable absence of the freak photography which was such a feature of the recent American Exhibition at Russell-square.

"It may interest some to learn that of the 284 pictures exhibited, 138 are from Great Britain, 52 from the continent, and 94 from America. As more than one-half were of foreign source, the exhibition can therefore hardly be considered representative of British photography."

❧

It will be remembered that the attitude of *The Journal* towards the salon is that of the conservative critic. The editor of *The Amateur Photographer* represents the other side. He says: "That the Exhibition as a whole is of greater general merit, and that most workers whom we are accustomed to see represented at the annual London Exhibitions have in their Salon work advanced, is a verdict which I have this year heard pronounced more generally and with more certainty and assurance than on any previous occasion, and at that I would much prefer to leave the judgment of individual works to each visitor to form for himself, for anything like a full report is impossible, and any attempt to criticise the pictures must necessarily be imperfect. The fact that

SPURR'S

SODIUM

Is a combination of sodium salts prepared in dry form, 2½ times stronger than soda crystals . . . . .

In comparing the cost of

SPURR'S SODIUM

Remember it is two and a half times stronger than Crystals, and that one pound Sodium and one ounce Pyro will make four gallons of developer that cannot be equaled in quality by any other known formula. The leading operators of the day are using it and speak of its merits. If you want fine chemical effects, with detail in both high-lights and shadows, you cannot get it with impure and cheap chemicals. You will also be surprised to find your fingers are not all stained when using Sodium.

ST. JOSEPH, MO.

In reply to your inquiry, I would say the fact that I have used your chemicals for producing the negatives for our exhibit at Detroit meeting of the P. A. of A., is the best evidence that I am pleased with them. Yours truly, L. G. BIGELOW.

For Sale by all Photo Stock Dealers

PRICES:

1-lb. can, 35 cts.; ½-lb. can, 20 cts.

BURKE & JAMES

Sole Manufacturers of Spurr's Specialties

118 to 132 W. Jackson Boulevard, Chicago

Kindly mention THE PHOTO-MINIATURE

only 284 prints have been accepted out of a total of between one and two thousand sent in should certainly result in those 284 accepted ones being of exceptional merit or interest, and as such should require not less than a column or so of criticism ere the subject is fairly done with."

Regarding the exhibits and exhibitors from the point of view of nationality, the international character of the show is seen in the record that ten French exhibitors had 34 frames accepted; thirty-four American exhibitors had 94 frames accepted; three Austrian exhibitors had 8 frames accepted; sixty-three English exhibitors had 138 frames accepted; and one frame each was accepted from Canadian and Indian exhibitors. The record of pictures accepted was secured by Mr. Clarence H. White, of Newark, Ohio, who had no less than eleven pictures accepted.

◆

We have just received from our printers new editions of THE PHOTO-MINIATURE No. 15: Intensification and Reduction; No. 18: Chemical Notions for Photographers; No. 20: Trimming, Mounting and Framing; and No. 24: Photographing Clouds. This is indisputable evidence of progress, in which we are sure that our readers share our pleasure.

◆

Telephotography has recently been employed to demonstrate the curvature of the earth's surface. At a recent meeting of the British Association (Glasgow) Mr. H. Yule Oldham read a paper on this use of telephotography, and showed several photographs illustrating its advantages. He said that in 1870 Dr. A. R. Wallace performed his well-known Bedford Level experiment. In the summers of 1900 and 1901 a series of similar experiments was made with the special object of obtaining photographic records of the same. The six-mile stretch of the old Bedford river between Welney and Denver was selected, as it was perfectly straight, had a bridge at each end, but none in between. The height of the parapet of Welney Bridge above the

MILLEN'S
French Satin, Jr.

THE STANDARD blue print paper of the world, with its record of nearly fifteen years, has passed the need of special mention. Everyone knows it—everyone uses it—everyone has satisfaction and pleasure in using it. Always best, now better than ever, and we do not slacken our efforts to increase its excellence. It is made perfectly and packed perfectly in sealed tin tubes, and WHILE IN THESE TUBES will keep indefinitely. We were the first to devise and carry out this method of packing, and though imitators have since sprung up, they only imitate the package, not the contents. There can be no better blue print paper than FRENCH SATIN, JR. that is our first and last word.

J. C. MILLEN, M.D.
DENVER, COLORADO

water-level was measured, a mark was set up on Denver Bridge at the same height above the water-level, and midway — three miles from each end — a mark was set up on a pole at the same height above the water-level. A telescope was then directed from the parapet of Welney Bridge to the mark on Denver Bridge, and the middle mark was seen to stand up about six feet above the line of sight, agreeing with the effect calculated to be produced by the curvature of the earth's surface.

◆

Pictorial Landscape Photography. By John A. Hodges. 111 pp., 5 by 7¾, with 35 illustrations. Paper covers, 75 cents; cloth, $1.

We are glad to see these papers, originally published in the *Photo Beacon*, reprinted in convenient and attractive form for the photographer's bookshelf. Mr. Hodges writes to help photographers to see the pictorial side of nature out-of-doors, and to secure sentiment and feeling in his pictures instead of mere topographical details. Every effort of this sort deserves encouragement. The little volume contains much practical information and we trust that it will meet with a large sale. Published by the *Photo Beacon* Pub. Co., Chicago.

◆

Depth of Definition and the Hand-Camera.—Under this title Mr. J. W. Salisbury contributes to *The Amateur Photographer* a valuable table for use with the hand-camera.

It is usual to have a lens of about 5½ inches focus in a hand-camera, and it often becomes a question with a precise worker as to the comparative advantages of stopping down or moving further away from the object to be photographed in order to obtain greater depth of definition. This matter becomes of more importance when the resulting negative is to be used for lantern slides or enlarging. If focusing on an object at a distance of 1 foot, we find that every doubling of the depth of definition means a quadrupling of the exposure. For greater distances the increase of depth is more irregular, and we cannot do better than express the re-

A FEW GOOD BOOKS

THE PERFECT NEGATIVE

A series of chapters on the after treatment of the negative—intensification, reduction, etc. By Rev. F. C. Lambert 135 pp., illus., cloth, 50 cents.

THE PLATINOTYPE PROCESS

A practical handbook, with facsimile prints before and after development. By W. J. Warren. 50 cents.

PLATINOTYPE PRINTING

Written from the pictorial standpoint; illustrated. By A. Horsley Hinton. Cloth, 92 pp., 50 cents.

PHOTO-AQUATINT or The Gum-Bichromate Process. The authoritative manual on this subject. By Maskell and Demachy. 55 pp., 50 cents.

THE GUM-BICHROMATE PROCESS

A later manual than the above. Written by a practical worker. Illus. by W. J. Warren. Cloth, 50 cents.

CARBON PRINTING

By E. J. Wall. Fifth edition, with a chapter on the Ozotype Process. Carbon frontispiece. 50 cents.

CHEMISTRY FOR PHOTOGRAPHERS

Practical information, plainly written. Second edition. By Chas. F. Townsend. 158 pp., 50 cents.

PRACTICAL PICTORIAL PHOTOGRAPHY

The best book on picture making by photography. Very fully illustrated. By A. Horsley Hinton. In two parts, cloth bound. Per volume, 50 cents.

THE BARNET BOOK

A collection of selected papers by well-known men. Capt. Abney, Chapman Jones, C. H. Bothamley, Harold Baker, A. Horsley Hinton, J. A. Hodges, Andrew Pringle, F. C. Lambert, etc. 287 pp., cloth, $1.00.

PRACTICAL REFERENCE BOOK

Of Photography. By F. Dundas Todd. In two parts. Very full of useful information, boiled down for ready reference. Per part, 50 cents.

Send for our Complete Book List

TENNANT and WARD

289 FOURTH AVENUE : NEW YORK

Kindly mention THE PHOTO-MINIATURE

sults in tabular form, which will be found at the end of this article.

For interiors, this table will, it is hoped, be of considerable value as showing what can and what cannot be focused sharply, and thus sometimes be the means of saving an otherwise wasted plate.

In order that the results shown may be correct, the lens must be an approximately symmetrical combination, and this is usually the case with those used in a hand-camera with a rectilinear lens.

The upper line in each space in the table gives the depth in feet, and the lower the distance of the nearest object in focus, and the distances are also given at which, with the various stops, the depth beyond becomes infinite.

FOR A LENS OF FIVE AND A HALF INCHES FOCUS

Distance		Depth, and nearest point in focus			
ft.	ft.	ft.	ft.	ft.	ft.
1	0.02 0.99	0.03 0.98	0.07 0.97	0.14 0.94	0.28 0.88
3	0.24 2.88	0.49 2.78	0.99 2.58	2.16 2.27	6.63 1.82
6	1.06 5.51	1.64 5.10	4.82 4.44	16.71 3.52	Infinite at 4 ft.
12	4.55 10.14	10.16 8.78	37.94 6.93	Infinite at 8 ft.	*
24	20.84 17.47	81.16 13.74	Infinite at 16 ft.	*	
48	168.06 27.36	Infinite at 31.5 ft.	*		
	Infinite at 63 ft.	*			

*Disc of confusion is taken at 1-100th of an inch, this being the usual basis.

With very long focus lenses stopping down can be shown to be very ineffective as a means of obtaining greater depth of definition.

◆

Snapshots by night may soon be a matter of course to every possessor of a camera. A new lens has re-

Orders filled strictly in Rotation

LLOYD'S PHOTOGRAPHIC ENCYCLOPEDIA
1901

Mailed postfree to all readers of "The Photo-Miniature" sending us 20 cents to cover cost of postage

---

A magnificent volume of over 400 pages, 6½ x 10 inches, in a strong cover of artistic design, containing a profusely illustrated descriptive list of everything used in photography, and many special articles on photographic work. Some of these articles are:

"The Progress and Development of Transparent Film." By L. B. Jones.

"Ray Filter Photography." By an optician.

"Instantaneous Photography." By Chester F. Stiles.

"Isochromatic Plates and Ray Filters." By R. Benecke.

"Photo-micrography." By L. B. Elliott.

"Flashlight Photography." By F. Dundas T

A complete list of 1 f the best books on all branches of photography a plainly written guide to practical photography, occupying 60 pages.

Send us 20 cents to cover cost of postage, mention this advertisement, and we will send the book at once

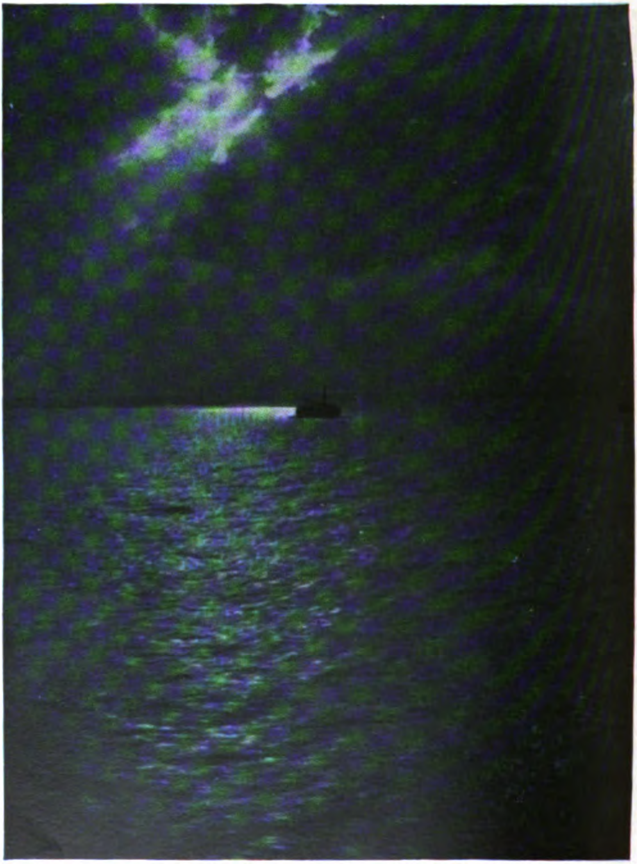
ANDREW J. LLOYD & COMPANY
BOSTON, MASS.

Kindly mention THE PHOTO-MINIATURE

cently been invented by a Dr. E. F. Grün, of Brighton, England, which works far more rapidly than anything yet fixed to the front of a camera, i. e., at apertures of *f*/1, *f*/½, and even *f*/¼ ! By its means it has been possible to photograph a theatre stage during the performance. A snapshot of a scene in "Florodora" is reproduced in the September number of *The Photogram*, in which an interesting account of Dr. Grün's startling instrument is given. Of late years some clever photographers have taken views in towns at night by the light only of the street lamps. Not many, however, have the patience to obtain such pictures, for the plate must be exposed for an hour or more, and, as the best results are obtained on wet nights, the risk of taking cold and contracting rheumatism are by no means slight. But with Dr. Grün's lens an exposure of a few seconds is all that is required. As a matter of fact, one of the views in this number of *The Photogram*—Brighton Pier—was taken in a quarter of a second.

◆

"How to Develop Lovell Plates" is the title of one of the best trade booklets we have seen in some time. It is published for free distribution by the Lovell Dry Plate Manufacturing Company, New Rochelle, N. Y., and we would like every one of our readers to possess it. The peculiar virtue of the booklet lies in the fact that it was written by Mr. F. A. Waugh, whose monograph on *Gum-bichromate Printing*, forms No. 22 of THE PHOTO-MINIATURE series, and that Mr. Waugh wrote from the standpoint of the independent experimenter, retailing his experiences with absolute frankness whether favorable to the Lovell Plate or otherwise. Apart from its fullness of information the booklet is admirable for its frankness and raciness of style. Witness its ending: "Finally, be clean. Cleanliness is next to success in photography. Pinholes, stains, streaks, sediment, frilled negatives and thumb-holes in the film are all the result of carelessness. The man who really can't avoid them had better 'push the button' and let somebody else 'do the rest.'"



LOOKING ACROSS NEW YORK BAY AT NIGHT
James H. McCorkle

The Photo-Miniature
A Magazine of Photographic Information
EDITED BY JOHN A. TENNANT
Volume III OCTOBER, 1901 Number 31

PHOTOGRAPHING AT NIGHT

At first thought, this title would seem to present a decided contradiction. The Century dictionary defines photography as "the art of producing images of objects by an application of the chemical changes produced in certain substances, as silver chloride, bromide, or iodide, by the action of light, or more generally of radiant energy." The same excellent authority tells us that night is "the dark half of the day, that part of the complete day during which the sun is below the horizon; the time from sunset to sunrise." Thus, there would appear to be no opportunity for photography during "the time from sunset to sunrise." And when we remember that in the early days of photography an exposure of nearly an hour was required in the brightest sunlight to produce a satisfactory image on the sensitive plate, the contradiction seems all the greater.

But there is much difference between night and darkness, even though night is the "dark half of the day," and in ordinary clear weather there is present more or less actinic or radiant energy during every hour of the night. The stars emit light; the moon reflects to the earth a share of the illumination shed upon her surface by the sun. Modern civilization is a bringer of light into dark places, and one who has at night stood upon an eminence within twenty miles west of Greater New York to view the distant radiance of city life, with its millions of electric lights lavished to the reflecting clouds, will need no argument to convince him that there is usually little real darkness anywhere outdoors where there is much human life.

The pursuit of photography, especially along the lines of thoughtful landscape work, trains the eye to a perception of the beauty of shadows as well as light, and, as the cultivation proceeds, the worker becomes charmed with the new beauties revealed to his eye when the sun is not pouring its full radiance upon the country-side. A winter's night, lit with soft starlight or brilliant moonlight, shows us many points in the view unsuspected in the day's illumination, for distracting detail is suppressed, and the softer mass-effects are seen. Artificial lights introduce another factor, and the multiplied reflections upon the park fountain of the overhanging arc light produce a dazzling effect impossible in the day, while many city streets lined with tall buildings are very much brighter at night than during the day.

Thus night, with its witchery of light and shadow, attracts the photographer, to whom all the effects of illumination, from whatever source, are only another incentive toward the pursuit of his fascinating art.

Who that is under the spell of the camera has not often longed for means to preserve in the shape of a photograph the many subtle beauties of the night? A time of the moon's unusual splendor; a wonderful lighting of the sky just after the sun has disappeared in the west; a great pyrotechnic display; a rainy night, in which the street lights show enticing reflections—all these attract the photographer. It is with the idea of giving him in convenient form a compendium of all that is available of the work of the experimenter in this line, and in the hope that night-photography may have a new impetus given it, that this little treatise is prepared.

Night-photography is peculiarly a pursuit of the adept. There is so much uncertainty as to exposures and values that the worker who hopes to succeed cannot afford to start without thorough daylight proficiency to aid him. He must be certain of his sunlight effects, for he needs to argue from known premises. He should have command of his chemical facilities, too, for the development of exposures made at night presents many special and peculiar problems.

Sources of Light

There are a number of sources of that "radiant energy" which is capable of producing images at night upon the sensitive surface of the modern dry-plate, and it will be well to enumerate them here. To begin with, we may properly mention the light of departing day, after the sun has set. Moonlight may come next; and an achievement within a year, when a skilful photographer-astronomer succeeded in making photographs by the light of the planet Venus, brings starlight well within the sources of energy. Lightning may be mentioned, both as an object to photograph, and more rarely as an illuminant. These are the usually available natural sources of light for photographing at night, for the light of Norway's "midnight sun," and the shifting radiance of the mysterious aurora borealis or "northern lights," while possible sources, are hardly to be considered as photographically practicable. I have not been able to learn that any photographs have been made by the light of the aurora, though perhaps Lieutenant Peary, when he comes home with a section of the north pole in his grip next year, will show us such work.

Man's ingenuity has provided many luminous sources of photographic action. We have no records at hand as to photographs taken by candle-light, but the coal-oil lamp which succeeded the penny dip has done something to impress the dry-plate, and its successor, the gas-flame, has triumphs to its credit. But these concern indoor photography. Night photography out-of-doors, such as we are to consider here, may be dated from the first extensive use of the electric arc and the incandescent filament as means of abolishing darkness. Not until the streets of our great cities were illuminated with electric lights did the possibilities of the field reveal themselves. Paul Martin's clever views of London by night, appearing in 1896-97, excited the emulation of thousands, and although much good work has been done along the lines he first laid down, I can recall no collection of night scenes surpassing his in pictorial or technical quality.

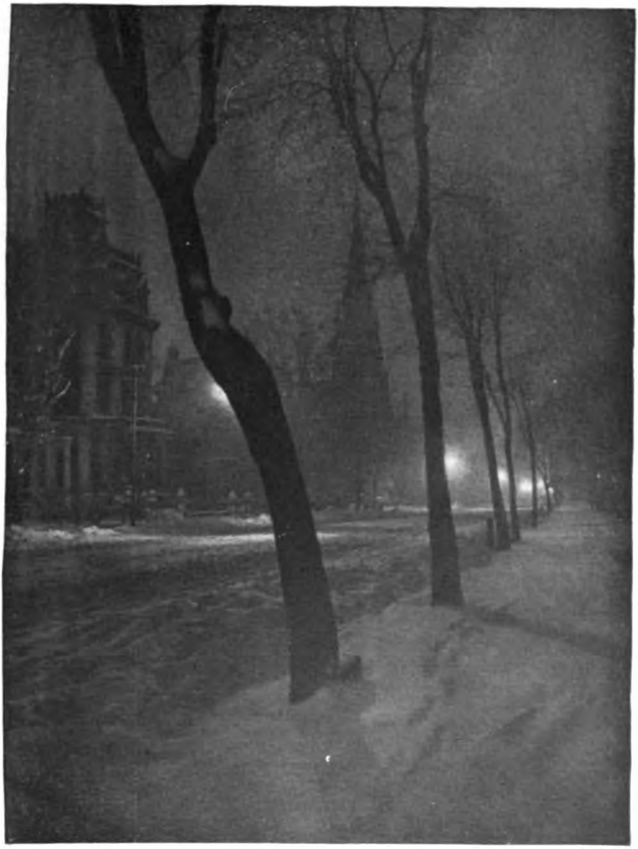
Fireworks, or pyrotechnics, afford another source of more or less actinic light, and some of the pictures in this number of THE PHOTO-MINIATURE give evidence of the interest taken by photographers in this possibility. Another artificial lighting is in the radiance from molten or white-hot metals in the industrial processes, or from open furnaces and the like. These sources are rarely used, but are still possibilities of picturesque value.

Of course "flashlight" work, by the aid of the metallic and chemical illuminants, may be termed night-photography, but as it serves to replace the daylight in effect, and the resulting pictures, if successful, show no peculiarly night conditions, it is hardly within the view of this monograph. It has been recently and exhaustively treated in THE PHOTO-MINIATURE No. 29, wherefore I shall not discuss it here, save in those cases when the flash is used as an adjunct to some other illuminant in the production of night photographs.

What to Photograph at Night

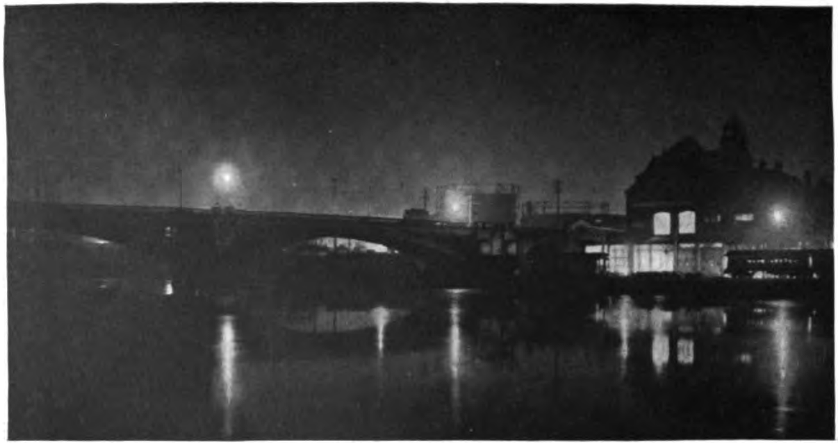
Having mentioned the sources of light for night photography, it is in order to briefly consider the things to be photographed by these various forms of actinic energy. Outdoor scenery in general is of the first importance in this connection, of course, and probably most of the efforts at night photography would fall under this category, whatever the illuminant.

There is then the photographing of the heavenly bodies—the moon and the stars—as a highly specialized form of night photography. Astronomers have eagerly seized upon the lens, the camera and the dry-plate to aid in their scientific inquiries, and the magnificent work done in the mapping of the heavens, resulting in many discoveries impossible to the eye alone, bears testimony to the immense value of photography in this field. As this work, however, for any results of real importance, requires extensive and costly apparatus to carry the camera, and special and very expensive objectives, it is not within the scope of discussion here undertaken. Some few interesting details of star trail photographs will be mentioned farther on, more from their importance optically and chemically than from any scientific standpoint.



NORTH BROAD STREET, PHILADELPHIA
W. C. Motteram

BROAD STREET. PHILADELPHIA
W. C. Motteram



Chas. C. Heyl

THE DESERTED PROMENADE
Osborne I. Yellott

The photography of interiors at night, to give a night effect, is by no means common, but there have appeared, in the investigation of this whole subject, some remarkable possibilities, as evidenced, for instance, in the work of Mr. Hines, alluded to later, and reproduced among the "inserts" of this number.

Apparatus

Addressing ourselves now to the main subject, we may ask as to the apparatus required for night-photography. Nothing peculiar is mentioned by the adepts save that one says "the first requisite is a strong weather-proof box camera," the necessity for which appears very pointedly when it is remembered that most of the fine results obtained are bad-weather effects. A simple but strong and easily adjusted tripod is suggested. We quote Mr. Fraser: "Working in the dark, with hands numb from cold and wet, the simplest operation becomes a task, and the more simple the apparatus, the better the chance of success."

Obviously, the quicker and better the lens, the shorter will be the required exposures, and here again the value of a good objective is seen. The lens, however, should be provided with an easily fitting cap, for it is often necessary to close it before an exposure is fully completed, and the shutter is not so reliable or safe as the cap. Some form of hood for the lens is most desirable, to keep off rain or snow.

A Rapid Lens

A new lens, working at remarkable apertures, has just been reported, and in *Photogram* for September, 1901, some reproductions are presented of photographs made at night with this objective. It is the invention of Dr. E. F. Grün, of London, and is said to work at *f*/2, or even larger. The resulting experimental photographs show, of course, but little depth of definition. While they are by no means pictorially or technically commendable, they are remarkable for the brief exposures which have been required to secure results at night. For instance, a portrait is shown, made with five seconds exposure under the light of one incandescent electric globe; another view shows a pier at Brighton, made in a fourth of a second with the ordinary brilliant electric illumination of seaside resorts. Should the system prove practical, it would add a new power to photography at night or in dark places.

Patience a Requisite "He who wishes to succeed in taking photographs outdoors at night should lay in, at the outset, a large stock of patience and non-halation plates. The former is indispensable, as are also the latter, if the picture is to contain any artificial sources of light." So writes another enthusiast; and it is apparent that rapid plates are desirable, as well, because of the prolonged exposures required at best. To the patience required may well be added good humor, for the gentle public loves to chaff the man who goes out at night with a camera. He will hear many wonderful things, and have to answer many "fool questions," even from his friends; he will be exasperated by the propensity of the ordinary human for standing in the wrong place.

Other Needs Some form of protection for the plate holders is essential. I know of nothing better than the heavy felt bags, divided into snug pockets for each holder, which have served me in sun and in darkness, in rain and in snow. Each bag takes three holders; it has a deep flap which tucks in, and it will go, with crowding, into the back of my box camera, so that the number of pieces to carry, when one moves along, is but two—the shut-up camera and the opened, ready-for-use tripod.

One should carry along some safely old and soft linen for wiping off the lens, should moisture condense upon it. According to Mr. Heyl, "a clouded lens means loss of all definition in the picture, and a dirty or streaked lens surface means a curious set of strong rays of light radiating from each lamp in the picture—a fault often mistaken for an evidence of astigmatism in the lens. Cleaning the lens with silk, or other non-absorbent material, will almost always cause such a fault."

"Fake" Moonlight Pictures Beginning now in strict order, we may take up the possibilities of photographing by the fading light of day, to produce the effect of a later hour, and may consider as well what is known as "fake" moonlight photography

—meaning by the latter those pictures showing a moonlight effect, with the moon herself apparently included.

Twilight pictures are usually taken after the sun has long disappeared. They become possibilities of beauty, when water is included, especially. Long exposures must be given, with the lens wide open; and if there is a sunset view included, the silent shifting of the clouds will provide some peculiar effects, not always admirable. Development for such pictures—and indeed for nearly all the various classes of exposures mentioned in this monograph—should be toward softness. Dilute developer and much patience are twin aids in obtaining an occasional result which will be pleasing. Mr. McCorkle's picture in this issue is an admirable example of such work.

"Fake" moonlight pictures mean those seeming to include the moon—and many plates have been wasted on attempts to get the moon herself on a negative in a real moonlight picture. Of these I will write later. It is sufficient to say that most so-called moonlight photographs are simply underexposures in daylight against the sun. The details for their production will be found in THE PHOTO-MINIATURE, No. 24: *Photographing Clouds*. Mr. Yellott mentions therein the possibility of making "imitation night pictures of landscapes with a good sky, by using a strong ray filter and giving about one and one-half times the proper exposure, followed by treatment with dilute developer, from which the negative is removed while the sky is yet quite thin."

General Requirements

Just here I may quote, even if not quite in order, Mr. Yellott's excellent statement that the "general requirements of a night picture are softness, suppression of detail in the shadows without its entire loss, high lights not too strong, and full of detail. Softness is obtainable by judicious focusing and the use of dilute developer. Detail in the shadows and suppressed high lights come from full exposure on backed plates followed by careful development in dilute developer. Isochromatic or other corrected plates are preferable for moonlight work, as the light is yellow, and the plates are sensitive to it."

Focal Length of Lens In making these sunlit pictures to represent moonlight effects, much consideration must be given to the focal length of the lens, if a "fake" moon is to be included. It is well to know that the eye is deceived as to the the apparent size of either heavenly luminary, especially when close to the horizon. The moon is as "large as a dollar"—or a dime, depending on the distance from the eye of the coin that will eclipse her! With an ordinary rapid rectilinear lens of focus approximating the diagonal of the plate that it covers—say eight inches on a 5 x 7 plate—the moon's image is a mere pin-head, and most unsatisfactory. The sun itself, if the lord of the day may be so veiled as to permit himself to be defined on the twice-backed non-halation plate, is of but little more impressive diameter, apparently. It is obvious, therefore, that lenses of long focus must be used when either sun or moon are included. Focal lengths from eighteen to twenty-four inches are suitable for 5 x 7 and 6½ x 8½ sizes, and in accordance with a well-known "law" of optics, an image of smaller diameter will *seem* to be as large on a smaller photograph. A recent English writer upon this subject gives a formula for readily calculating the diameter of the image of the sun produced by any lens as follows: Multiply the focus of the lens by .0088; the result will be the diameter in decimals of an inch that the sun's image will produce on the ground glass.

Working in a Moon A method of putting a real moon image into a sunlit or "fake" landscape is credited to the English dry-plate maker, Mr. Edwards. The procedure is described as follows:

"He exposed a plate on an excellent example of sunlit clouds, noting carefully the position of the sun. Some time after, when the moon was approximately in the same position, he took a photograph of her on a film with so rapid an exposure that only the moon appeared. He then printed both negative and film at one and the same time, being careful, of course, to place the film negative of the moon so that that luminary occupied the proper place in the heavens." The result was excellent.

Another Plan

Another method of securing results from the moon is described in a letter from Charles C. Heyl, a capable worker from which it is quoted here:

"Pictures containing the moon are most tempting to the amateur, and also most exasperating to get, so long as he cannot control the weather or the clouds. 'The moon do move' in a picture, and only a brief exposure can be given her, in general hardly sufficient for the remainder of the picture, the landscape or waterscape or whatever it may be. The fellow who desires to be hailed by the genius as 'that moonlight camera fiend' and to deserve the honored title, must know and recognize this instability of character in Her Majesty of the realm of night, and cater to it. The moon's angular diameter is about a half degree, so that it takes her about two minutes to travel across the heavens a distance equal to that diameter. This is also true of the moon's image on the plate in the camera. If we limit the amount of motion allowable in the picture to $\frac{1}{120}$ of an inch, so as not to spoil the definition of the moon, then if X is the diameter of the image of the moon on the ground glass, in fractions of an inch, the exposure must not be greater than $\frac{1}{X}$ in seconds. Thus, if the moon is $\frac{1}{10}$ inch in diameter on the ground glass, we may safely expose the plate ten seconds, but not longer. The time of exposure for the unclouded moon is given in the following table, which is for a Cramer Crown plate, stop 16 (U. S.) or *f*/16. Times for other plates and stops can easily be deduced therefrom.

Hours after rising or before setting	Exposure in seconds
1	8
2	5
3	3
4	2
5	1

"In taking moon pictures, use the longest focus lens possible, to include what is wanted in the picture.

There are necessary, under ordinary conditions of light, *two* exposures on the same plate. First focus on the moon, then adjust the camera with the moon not far from the edge of the picture toward which it is traveling (if it is not near setting). Expose for the moon alone (with its reflection, if there is water), cap the lens to keep out dampness, and wait until the moon has traveled out of the picture, or has set. Then expose for the landscape, giving the picture from one to four minutes per stop number (i. e., from 16 to 64 minutes for *f*/16), depending upon the illumination. An ordinary street with gas or electric lights requires one minute per stop number (on Seed non-halation double-coated plate). Under certain circumstances it may be desirable to reverse the above described process and expose for the landscape first, and for the moon later. Such pictures, however, are faulty in not showing the moon so large in comparison with other objects as she really *seems* to be when viewed with the eye. A method of surmounting this difficulty was practiced as follows: Landscape exposed with lens 6¾ inches focus on one plate (exposure 10 seconds, stop No. 6,—just after sundown). Moon exposed with 12½ inches focus on another plate, later. (Both plates Cramer 'Crown.') Film stripped from moon plate with hydrofluoric acid (which 'stretches' the film slightly, adding to the *large* effect of the moon), and registered on landscape plate, being allowed to dry there. Thus there was obtained a double-film negative, in which the moon was proportionally much larger than 'natural'—in this case about double the diameter. The print was made through both films. If the moon film is dried separately on a greased plate, and removed therefrom when dry, it can be used to 'print in' a moon in any night picture."

True Moonlight Work But moonlight pictures, pure and simple, are undoubtedly most characteristic of night photography with natural lighting. I refer now to exposures made upon views illuminated by the soft light of Luna, and not to attempt to include her fickle majesty in the view; attempts, I may say with the assured support of every one who has tried, that go far to justify the designation of the queen of night as fickle and inconstant, nothwithstanding the ingenious method above suggested, and dozens of others that may succeed occasionally.

That the moon reflects light of considerable actinic power is well known to every worker who has attempted to change rapid dry-plates at night where her rays penetrate. And when these rays are reflected back from the earth's surface by water or snow, they are, of course, vastly more active. Indeed, the mistake is frequently made of exposing a plate so long upon a selected view by brilliant moonlight as to give what is practically a daylight result. I have before me now such a photograph, sent in by a friend interested in photographing at night. He says "the exposure was ample; the detail in the foliage is fully shown." Just so; but no one would suspect this pretty photograph was a night view! At the outset, then, we need to establish, in regard to all night photographs, that exposure is to be figured so as to *avoid* that fineness of detail and fullness of illumination characteristic of daylight. Another fine bit at my hand from a capable worker just misses a twilight effect, and his exposure was but half that given by the gentleman who got "detail in the foliage." No obtrusive detail should show, obtained either by prolonged exposure or by "stopping down" the lens, that the eye does not very readily perceive in looking over the contemplated view. Of course the lens will "pick up" many unsuspected details, but I refer to the stronger features of a landscape view.

Exposures Required

Details in regard to exposure vary greatly, as is natural. The brightness of the moon is strongly affected by the amount of moisture in the atmosphere; the presence of snow or water, as before noted, introduces another factor; the color and character of the main objects in the view selected; the height of the moon in the sky, and the direction of the lighting—all these have a bearing on the time to be allowed. Another important factor in these days of profuse artificial lighting is the presence nearby, even if not included in the view, of electric or other lights, whether these supply direct or diffused rays.

W. A. Fraser, whose beautiful night photographs early in 1897, following after the superb work in England of Paul Martin, did much to attract attention to the subject, was probably the first to combine moonlight with electric light, and he then found that with a full moon, an exposure of ten minutes on a rapid plate, with a lens working at *f*/8, was sufficient. The diffused light of the great metropolis, and the snow on the ground, undoubtedly halved the necessary exposure, even in Central Park. Taking the consensus of experiences reported, it would appear that with a wide-open lens (and there seems no reason for "stopping down" in properly composed moonlight views) the exposure will vary, on a backed rapid plate, from ten minutes to one hour—the former for snow scenes, the latter for hazy moonlight and dark objects.

Support of the Camera

It is necessary that the camera be firmly supported during the prolonged exposures required, and this means a rigid tripod, and Mellen's tripod stay, to prevent vibration from the wind. I have found it an advantage to have with me always on trips photographic, whether by day or by night, a length of stout twine. Looped about the tripod screw top with a sailor's "double half-hitch," the ends may be attached to any convenient weight, and a couple of common bricks have thus given aid to the photographer more than once. It is also necessary to cap the lens if any moving light—as a carriage or bicycle lamp, or a trolley car's headlight—should cross the field of view during the exposure. Walking figures need not be so guarded against—people may be passing in a stream and make no impression whatever on the sensitive plate. Indeed, the "lonesomeness" of moonlight pictures is a distinct lack. To pose a figure for a half-hour or more on a winter's night is hardly possible; the photographer himself, with his opportunity to move about for warmth and relief, and his burning enthusiasm also an agent for resistance to cold, could hardly ask such a thing. The new lens, to which allusion has been made, may eventually aid in reducing exposures. Alfred Stieglitz has introduced life into some of his fine night pictures, but they are not moon-

A WINTER'S NIGHT
Prescott Adamson

WOODS FIRE
Osborne I. Yellott

light effects, being made under the glare of the city's electric brilliance, reflected by rain.

Composition

Rules of composition and lighting for moonlight pictures do not vary greatly from those for daylight work. As the dimness and mystery of night are likely to be the chief charm of night photographs, there needs to be more than usual care toward the selection of a salient point in the view to be attempted. The commonplace photograph of a building or a tree, or any other thing which does not make its appeal by a special beauty of form, line or contrast, should certainly not be attempted at night, when conditions are difficult, and results uncertain. A study of the results attained by successful workers, and a comprehension of the principles of composition, will aid the ambitious beginner.

Photographing the Moon

Brief mention may be given to photographs of the illuminants of the firmament at night. In no science has the aid of photography been more eagerly and successfully availed of than in astronomical research. The great work done at the Lick Observatory, in California, in photographing the moon, has been fully exploited in the magazines. The advance of photography in sixty years is boldly marked by the contrast between the announcement in 1840 that "Dr. Draper has succeeded in getting a representation of the moon's surface by the daguerreotype. . . . The time occupied was twenty minutes, and the image about one inch in diameter," and a recent statement by Professor E. S. Holden that "the enlargements from our negatives meet every want, and enable us to construct a satisfactory map of the moon, on a scale of ten feet to the moon's diameter." These results are made possible by the use of the great Lick telescope, with its object glass of 36 inches diameter, combined with which is a supplementary lens of 33 inches diameter, the two making a photographic lens with a focal length of 47 feet, six and two-tenths inches. Mounted as an equatorial, this splendid instrument follows the moon in her course, and sharp images of the luminary are made at a diameter of over 5 inches, capable of being enlarged as above noted.

Photographers will note with interest that *f*/71 on this great lens represents an opening of about 8 inches diameter! At this aperture, a successful general view of Luna is obtained with an exposure of three seconds.

Star Trail Photographs

Photography has been of immense aid, also, in registering the stars. The sensitive plate records not only stars invisible to the naked eye, but also many not visible in good telescopes. The amateur, with his inability to cause his camera to follow the stars in their courses, can only make star *trail* photographs. Some interesting information in regard to this is quoted from a letter written by Percy Meredith Reese:

"Apart from making pictures of our sun and its planets (the moon, Jupiter, Venus, which are *not* stars), stellar photography may be divided into two parts—the making of maps of the stars at night, which requires very long exposure with apparatus specially constructed to follow accurately the motion (apparent) of the heavens, and in which I have no experience; and photography of "star trails," of which I made a few negatives last year in preparation for a trip to North Carolina, which, with other members of our Academy of Science, I made to observe the solar eclipse. I can give you the results in a few words. Star trail photography is useful and necessary for the purpose of finding the correct focus or distance behind the lens at which the plate must be set in photographing the heavenly bodies. The visible image on the ground glass, as used in landscape work, is quite useless because of the difference between the visible focus and the focus of the actinic or chemical rays of such infinite distances as must be dealt with in astronomical work; and this focal distance is accentuated because in order to obtain a photographic image large enough to be of any value, lenses of very long focus must be used. On the path of totality in the solar eclipse last May lenses of a focal length of forty feet and more were used, and in these the difference between the visual and the actinic focus was often twelve inches or more. The only way to find the latter is to experiment upon a star as it trails across a stationary plate.

"I have a print of the trail of Venus made in May, 1900, at 9 P. M., with the back combination of my Goerz lens, the visual focus of which is about eleven inches. On a firm tripod I roughly focused, with full opening, upon the planet, and then racked out the lens about a half inch: exposed five minutes on a fast plate, and without moving racked out a quarter inch more and exposed ten minutes; racked out another quarter and gave ten minutes at that, and once more ten minutes at another quarter farther still, carefully marking on the bed of the camera each of these four positions. The third of these periods gave the fullest line, or sharpest focus, and this mark, after confirmation in several similar trials, although it was fully an inch and a quarter beyond the visual focus on the ground glass, was the one I used in securing several sharp images of the corona during the ninety seconds of totality of the eclipse so sharp that I have enlarged them as much as two hundred times."

Lightning

Of natural sources of light for photographing we need only further take up that always awe-inspiring phenomenon, the discharge of electricity between clouds and earth, called lightning. Photographs of lightning are numerous, and they have dissipated another of the fictions of the artist, whose depiction of the horse in motion Mr. Muybridge forever upset with his cameras. The conventional zig-zag lightning is "conspicuous by its absence" on the photographic plate. Almost straight discharges sometimes take place, but there is more often a sinuous appearance, resembling that of a large river, as depicted on a modern map, and the branches are not wanting. There are recorded some wonderful "ball" and "burst" discharges, and a recent competition brought out several remarkable photographs showing ribbon flashes. Some of the most interesting effects have been of the so-called "dark flashes" in which the image was reversed on the negative; due, no doubt, to the peculiar photographic phenomenon known as reversal which appears on prolonged exposures. Photographs made by lightning, of landscapes and other objects, are not so plentiful, but are by no means impracticable. The photograph of the Capitol at Albany, New York, printed in this issue, is a good example. This resulted, Mr. McCorkle writes, from an exposure of a backed plate at *f*/16 for five minutes while a thunder storm was coming up, during which time there were seven bright flashes.

The procedure for taking advantage of nature's electricity as an illuminant is very simple. The requisites are much the same as for any night photography, but as one will almost surely have to endure thunder showers, especial precautions must be taken for keeping the lens surface dry and the plates out of the rain.

Requisites

The preparations required for attempting this branch of night photography are well stated in the following quotation from a recent article in *Photography:*

"To photograph lightning the camera must previously have been marked, so that when a storm is seen to be brewing the back can be extended to such a position that distant objects are known to be in focus. This should be done beforehand by turning the camera on some well defined object at a distance of three or four hundred yards, and focusing it sharply, marking the positions of camera front and back, so that it can be at once replaced in that position without looking at the focusing screen.* Any camera will answer; a half plate or a 5 x 7 is a good handy size.

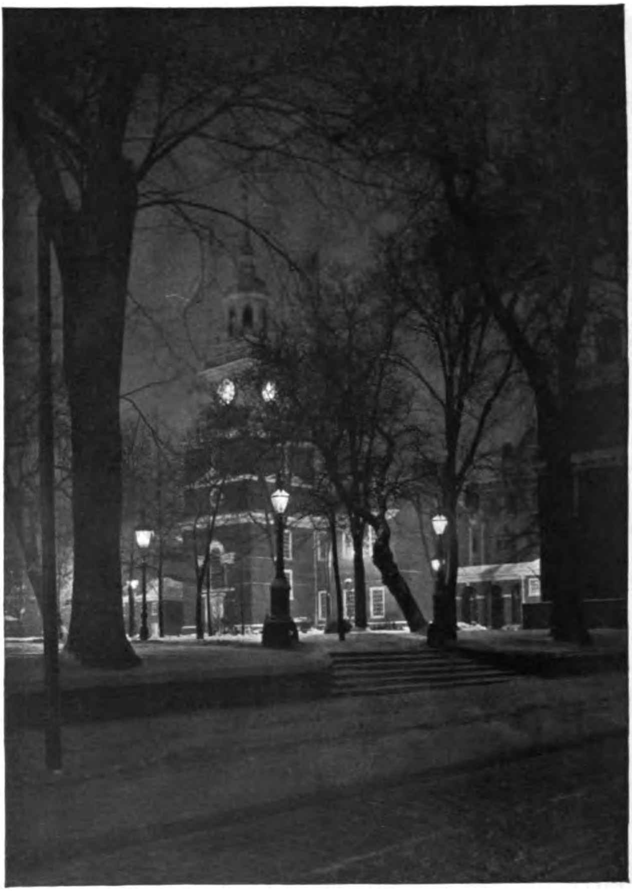
"The lens should be one capable of covering the plate well, right up to the edges. One of the modern flat field lenses is the most suitable, beyond a doubt. Its focus should be known, and marked on all lightning prints obtained with it. The bigger the aperture at which it will work the better. Faint flashes can only be secured when a large aperture like *f*/8 is used.

"The plates for the same reason should be as fast as procurable. It has been recommended that they should be double- or triple-coated, though many, probably by far the greater proportion, of lightning flashes have been secured on single-coated plates. For the same reason, backing the plates should be found advantageous.

---

*One of the modern folding cameras with a tested focusing scale would of course make unnecessary that procedure.—EDITOR.

THE CAPITOL AT ALBANY, N. Y.
James H. McCorkle



INDEPENDENCE HALL, PHILADELPHIA
W. C. Motteram

"The procedure is extremely simple in the case of storms at night time. The camera is extended, a plate put in, and the slide of the plate-holder drawn out. The lens is pointed in the direction in which the flash is expected, and uncapped. It is as well to wait until it seems likely that two or three flashes have been secured before changing the plate; it is generally only one, out of three or four of the flashes that are seen, that will be found upon development. From time to time the plates should be changed until there seems no further likelihood of getting any more flashes.

"Development should be pushed as far as possible, whether anything can be seen upon the plate or not. When the edges show decided signs of fogging, then it can be stopped and the plate fixed. It sometimes occurs that flashes which could not be seen at all in the dim light of the dark room are plainly shown on the fixed negative.

"Notes should be taken of the date and time of the storm, the place at which it was photographed, and as accurately as possible of the point of the compass toward which the camera was directed. Also of its tilt, if it is not horizontal, which will not often be the best position for it. Unless there is likelihood to be some object, such as a tree or a roof, clearly visible on the plate, the top of it should be marked on taking it out of the holder. This is better done in any case. A note of the interval between the flash and the thunder is also useful."

The Camera May Move

An interesting peculiarity of lightning photographs is that the camera need not be kept still during the exposure; indeed, some experienced workers hold the camera in the hands, with the lens open, waving the instrument about in the general direction of the storm center. If the operator is fortunate, a number of flashes may be recorded on the same plate. It has been estimated that the duration of a lightning flash is between a hundred-thousandth and a millionth of a second — which, it would seem to the layman, matters little! There is, however, an oscillation which continues the effect over a more appreciable interval of time, but always it is quick enough to impress itself upon a rapid plate held in a moving camera without any evidence of the latter's motion being apparent in any negative that may result. Of these and other peculiarities a recent writer discourses entertainingly thus:

"It is sometimes the case that when the camera is not moved about, but is fixed firmly on a stand, that, instead of one flash being shown there are several in parallel paths. This is due to the successive components of the flash following not the same path, but one a little different in each case. The first discharge heats the air through which it passes, and in so doing renders it a better conductor. The following discharges have a tendency to follow along this path of heated air, and presumably do so. But if it has moved to any extent between the first and subsequent discharges, their path will also have shifted, and on the photograph we shall not have one well-defined flash, but a series not very far apart — for in the short time that elapses the air could not have gone far — and pursuing a course of the same general shape. This points to a very useful direction in which photographers might work. There is no need to keep the camera stationary when trying to photograph lightning. It is, indeed, better to keep it moving, so that, if possible, the successive discharges may not fall upon exactly the same part of the plate. A better plan still is to employ a plate rotating at a known rate, so that the separation of the lines can be used to determine the time which elapses between each of the components of the flash. This, however, is a refinement which few photographers will care to adopt."

Approach of a Storm

The ambitious photographer who undertakes to record Jove's thunderbolts may be aided by a little meteorological knowledge, enabling him to judge as to whether the center of a storm is approaching him or receding from him. It is well known that sound travels much more slowly than light, which travels silently at the marvelous rate of about 186,000 miles per second, while its noisy companion is pounding its way along at less than 1,100 feet per second. As the voice of the thunder and the light of the flash of a lightning discharge start nearly together, the time which elapses between seeing a flash and hearing its concomitant thunder gives the distance from the point at which the discharge took place, at the rate of about five seconds per mile. Thus, if a flash is seen, and the report is heard ten seconds later, the observer may know that the discharge occurred about two miles away. Now by noticing whether this difference in time is increasing or diminishing, one can easily determine whether or not the storm center is advancing or receding.

Natural Gas, etc.

Photographs at night have been made by the light of burning natural gas, and also by the light of great conflagrations. As these sources of light are not natural, nor of ordinary occurrence, I do not discuss them more than to suggest that either affords an opportunity to the restless amateur, to whose efforts I wish well! There are no details as to exposures, which must obviously be short.

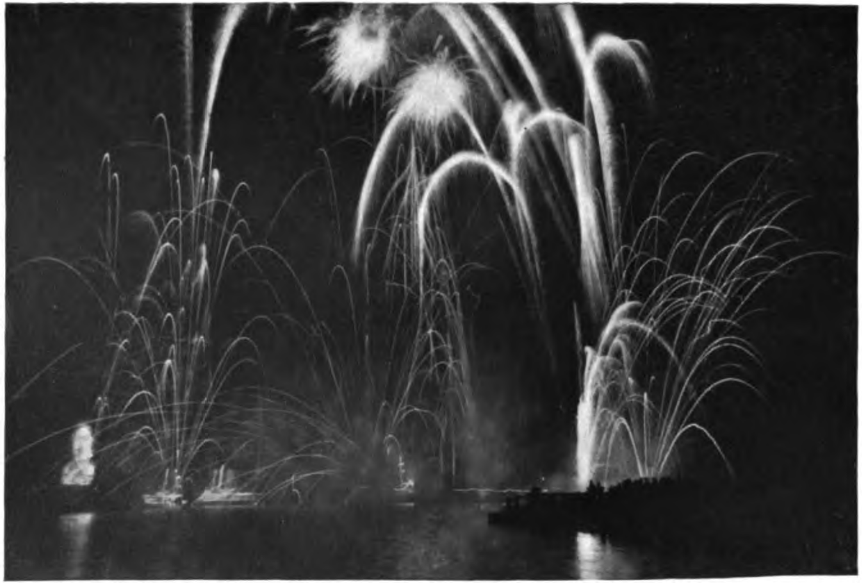
Photographs of luminous objects at night, as molten iron, furnaces, and the like, need to be skilfully managed in connection with flashlight. In such attempts it is usual to so dispose the flash material as to increase, apparently, the illumination arising from the luminous object itself. It would not do, for instance, to photograph a white-hot ingot of steel in a rolling-mill by the aid of a flash, and have the flash so disposed as to cause a shadow to fall *toward* the luminous metal. I have long desired to test the picturesque possibilities of a great blast furnace which I occasionally pass at night. As the stream of newly-made iron issues from the furnace mouth and pours along the channels in the sand which cool it to the commercial "pig" form, it blazes and flames and scintillates with light, and the attendant iron-workers, seen in sharp silhouette, appear as gnomes. A great steel-making plant, where iron is "converted" by the Bessemer process to the higher form, with a marvelous incidental show of true fireworks, would seem to present wonderful photographic chances. Perhaps some enthusiast may be moved to try these practically untouched opportunities for night pictures, and, again, I wish him well!

Street Scenes at Night

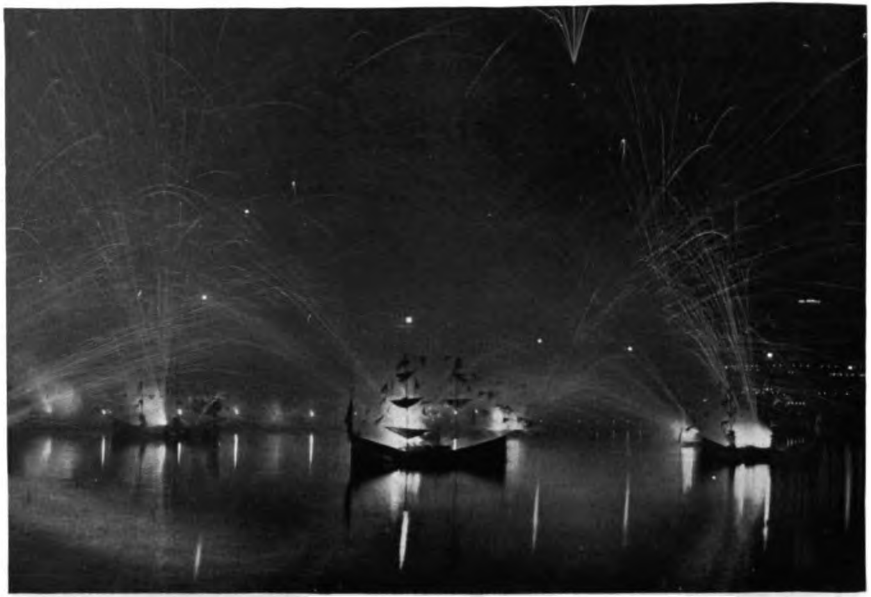
After all, vastly the greatest interest in night photography attaches to the depiction of street scenes and the like by means of the artificial illumination that makes bright and safe our city streets. For myself, there is always a deep regret at one lost opportunity. After a day's arduous work photographing on the North river and in the harbor when New York city formally welcomed Admiral Dewey, there came a night of more arduous development—for the results were to be in the engraver's hands with the morning light. Going out from the dark room into the street about 11 P. M., I found a heavy rain had cleared the streets of people. The great white Dewey arch was ablaze with light, emphasizing its lines of beauty, and the reflections on the wet street made every photographic nerve tingle with desire. Alas! all the backed plates were used, the camera was a mile away, the duty of the night pressing—and I still regret that I could not attempt that scene of rare and peculiar beauty. The arch never looked so well again, and I have seen no wet night picture of it.

It was 1896 and 1897, as before mentioned, that the photographs of "London by Night," by Paul Martin, showed the picturesque possibilities of the streets of a great city under electric light. His work was artistically fine, and most interesting from its technical quality. "A Corner of Trafalgar Square," and "A Wet Night" were revelations as to the opportunities awaiting the capable photographer. It is to be regretted that Mr. Martin has not kept up his work, and that we do not have his word upon it in this little monograph—for who could speak so well as one who first of recent years realized and developed these novel and beautiful effects?

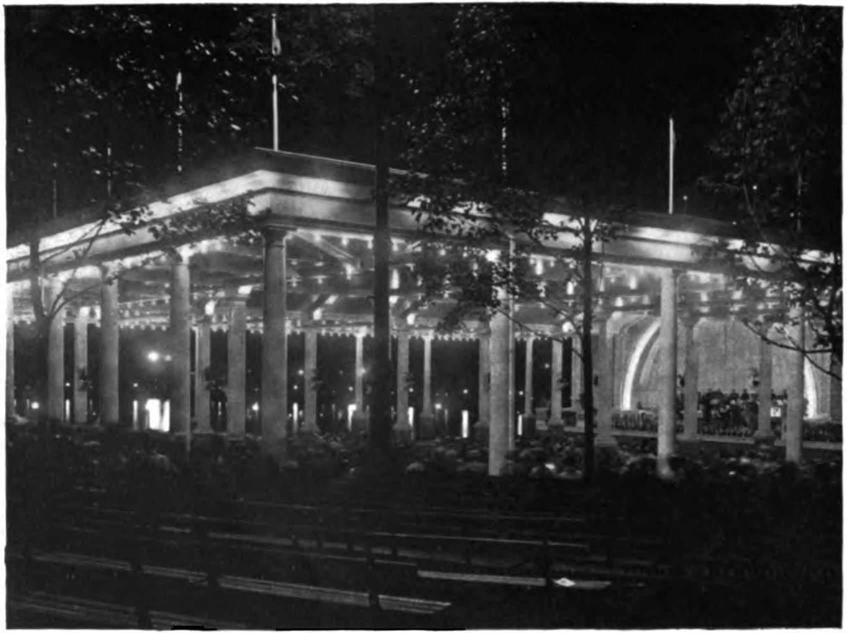
Some of the best of the American workers were prompt to take up this fascinating and unusual branch of photography; for while there had been previously some good work in night-photography by the aid of flash powder of various kinds in combination with the luminous bodies which were to be pictured, very little had been accomplished along the truly pictorial lines of Mr. Martin's work.



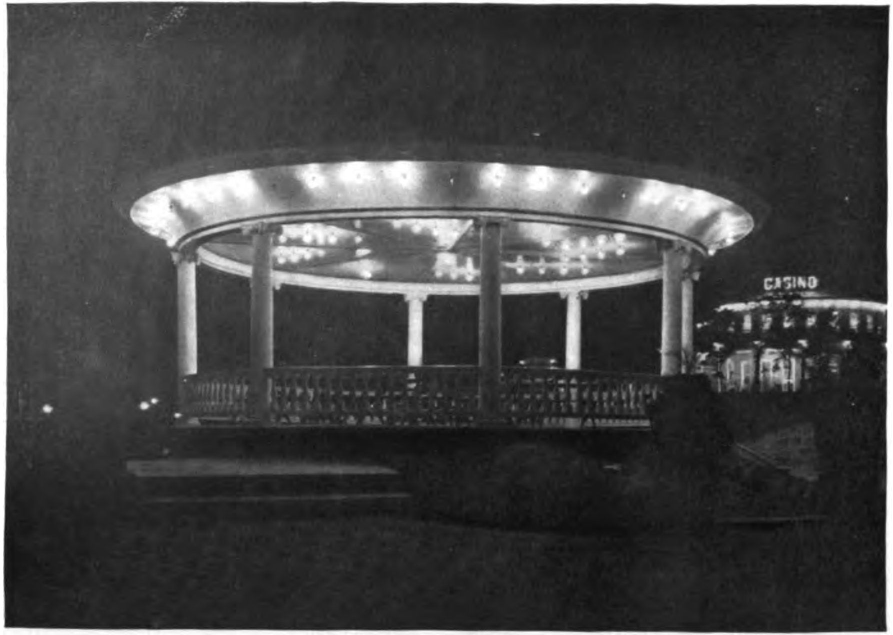
PYROTECHNIC DISPLAY, CENTENNIAL PARK, NASHVILLE, TENN.
Percy Rapier Hines



PYROTECHNIC DISPLAY, WOODSIDE PARK, PHILADELPHIA, 1900
M. J. Ryan



SCENE AT WILLOW GROVE PARK, PHILADELPHIA: I
M. J. Ryan



SCENE AT WILLOW GROVE PARK, PHILADELPHIA: II
M. J. Ryan

Historical

In 1891 Wallace Goold Levison presented in *Scribner's Magazine* some reproductions of interesting photographs of pyrotechnics and other night effects. One of the pictures, made in 1888 of the electrical illumination of the Trocadéro at the opening of the Paris Exposition, serves well as a contrast to the present day views of the fairy-like electrical work at our own Buffalo Exposition of 1901, for the vast advances both in photography and in illumination are very apparent. In commenting on the photographs of that day, which of course were then most remarkable, Mr. Levison indulges in a bit of prophecy:

"Indeed every advance in the art of photography develops important applications of it in entirely new and unexpected directions. Not only a small body of professional photographers is intensely interested in important experiments, but a body of amateurs, so large as to include almost every section of a community, is busily at work with new devices and new methods, supplementing private letters, diaries, newspaper correspondence and literary work with accurate and picturesque records of events of every degree of importance. The result will be that this age, as no previous one, will leave a complete pictorial representation of all phases of its varied life."

American City Life

The work of Alfred Stieglitz was probably the first showing in America of the influence of Mr. Martin's pictures, and W. A. Fraser followed close with his studies of city life. The English pictures were all notable for the absence of apparent life in a city teeming with its millions — due, doubtless, to long exposures and a distinct effort to avoid any partial or inadequate introduction of figures. As before noted, in an exposure of of many minutes, passing figures do not in the least affect the plate, unless they carry light in some form, in which case the careful operator immediately caps his lens until the disturbing light has passed on. As lenses and plates improved, the ever-progressive worker used his facilities up to their limit, and some of the notable night pictures made by Mr. Stieglitz, with exposures of fifty to seventy seconds, have included figures. Practically all of those relatively quick exposures were made on rainy nights, and in locations brilliantly lit with numerous arc lights, these softened by opal globes. The wet streets, of course, reflect much light, and the beautiful wavy lines, shadows and reflections due to the rain make the results exceedingly pleasing.

Details by Mr. Fraser

In an article published in *The Photographic Times* in 1897, Mr. Fraser gives some details as to his methods, from which I quote. He says:

"Working on Mr. Martin's lines, I at first included in the exposure a minute or two of the last departing daylight, if it might so be called, but my negatives approached too nearly daylight results, and I have since waited until night has really fallen before making the exposure.

"Having chosen the view and set up the camera, if the only lights included are gas lamps, the exposure with this lens and plate should be from eight to ten minutes, depending somewhat upon the distance to the nearest light, while if any electric lights are included, from two and one-half to three and one-half minutes will suffice. When I speak of electric lights, I refer to those enclosed in opal shades, such as are used on Fifth and upper Madison Avenues in our city. Unprotected lights, such as those enclosed in plain glass shades, I have never attempted, and doubt very much if they can be successfully photographed.*

"During the exposure, a watch must be kept that no vehicle carrying lights crosses the field of view. My practice is to stand beside the camera, keeping one hand firmly on it, if it is blowing hard (several exposures I found were ruined through movement of the camera caused by the strong wind); then when a cab or other vehicle carrying a light enters the field of view, I, with the other hand, cover the lens until it has passed. Moving objects not bearing lights make no impression on the plate.

"In the development I aim at softness, and use a

---

*Mr. Fraser used Seed's non-halation plates, backed, and a Ross Rapid Symmetrical lens working at *f*/8.

rather weak metol developer, two ounces stock solution diluted with water to four ounces, and with very little, say two drachms alkali, no bromide. The amount of detail picked up by the lens when using this plate has been a constant source of wonder to me; in every case very much more than my eye could see was disclosed when the plate had been developed and fixed.

"I prefer a stormy night for this work, either snow or rain, as the artistic effect is unquestionably much greater on these occasions."

Lens "Ghosts"

The more recent lenses, working at such apertures as *f*/6.8, *f*/5.6 and the like, have greatly reduced the exposure time required; and should the lens of Dr. Grün prove practicable, we shall be very close to almost instantaneous exposures of brilliantly lighted scenes at night. An important caution in regard to lens work comes from Mr. Heyl, who writes:

"Look out for 'ghosts' in pictures illuminated by strong artificial lights. If a lens is inclined to make demonstrations, the only cure I know of is to use either combination singly, but not the two together. The ghosts which have hampered me and my pictures seem to have been born between the front and back combinations in my lens. Either combination alone works well enough, but I cannot take a street picture with both together, if a strong light appears in it, unshaded."

The Parks at Night

The resorts about the great cities are usually brilliantly lit, and in some of them novel displays are arranged in the way of electrically lighted fountains, and the like. These are naturally fascinating subjects for the enthusiast in night-photography, but few seem to have studied the possibilities or depicted the beauties of such places. Several reproductions are given in this monograph of the work of M. J. Ryan about some of the Philadelphia parks. All are remarkably successful, and one is especially noteworthy because of the large number of figures shown, listening to a band concert. In a letter treating of his work, Mr. Ryan gives many details and recounts his experiences. A portion of the letter follows:

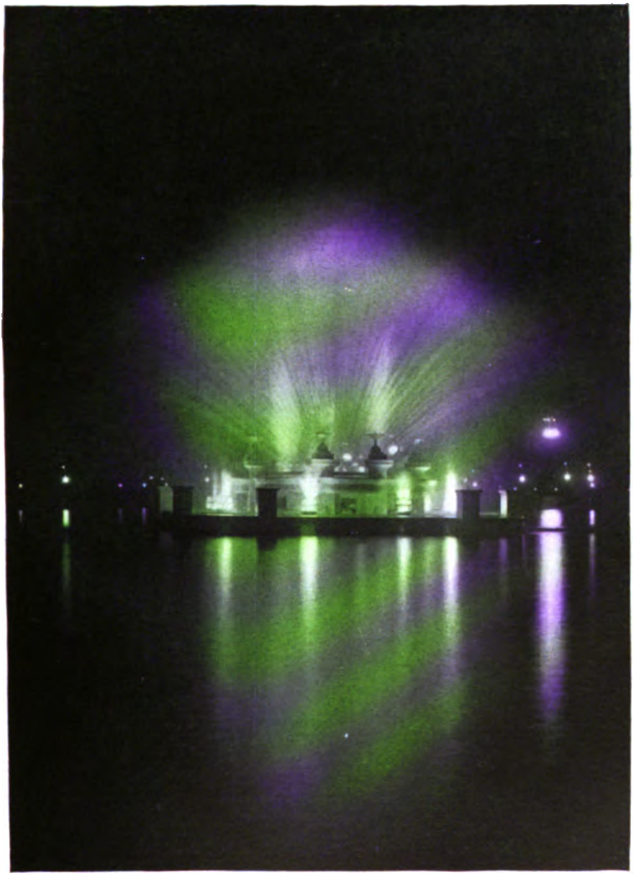
"The examples of night photography submitted are the result of much careful observation, thought and experiment. I have always been deeply impressed by the somewhat weird but picturesque beauty of the night scenes about the parks, the city streets and bridges, the railroad yards, etc., and to a lover of the beautiful the desire to record them is irresistible.

"The first experiments were made at Willow Grove Park, late in the summer of 1899, with a cheap lens, on a non-halation plate (5 x 7). The subject chosen was the electric fountain. The results were very interesting and paved the way to subsequent experiments during the following season.

"The next experiment was made a few weeks later at Woodside Park, Philadelphia, using a No. 4 Goerz lens, series III (*f*/7.7), on a 5x7 non halation plate, the subject being 'The Casino.' The effect at night, from a distance, viewed through the trees, is very beautiful. The point of view chosen includes these trees in the foreground. Having focused sharply on the lights, the lens was stopped down to *f*/16, securing beautiful detail in the building and bringing into focus the trees and benches, which serve to break up the heavy, monotonous blacks of the foreground. An exposure of ten minutes was given, with a successful result.

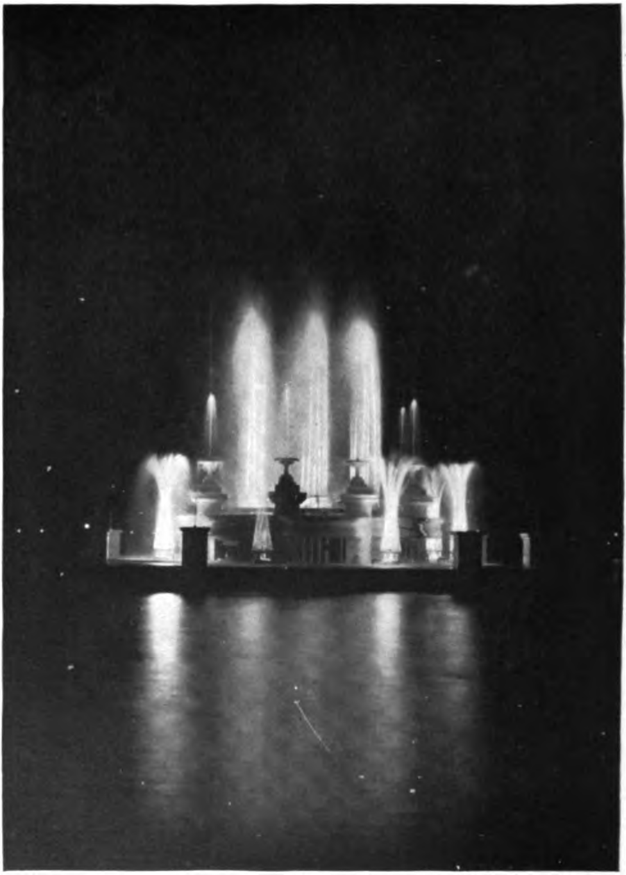
"During the summer of 1900 further experiments were carried out at Willow Grove Park, covering all of the buildings, the new music pavilion and the electric fountain. The latter is always the center of interest to the photographer as well as to the thousands of visitors who nightly gather to admire its ever-changing designs and colors.

"After waiting patiently for several evenings, the exposures on the fountain were made when there were no disturbing breezes to mar the design. By arrangement all colored lights were turned off, and two or three designs were given for a fixed period, illuminated by white light only. The point of view was chosen with reference to background, and elimination of as many lights as possible, the dark sky serving best to bring out the impression of the delicate spray.



A FOUNTAIN AT WILLOW GROVE PARK, PHILADELPHIA: I

M. J. Ryan



A FOUNTAIN AT WILLOW GROVE PARK, PHILADELPHIA: II
M. J. Ryan

An Electric Fountain

"These experiments on the electric fountain were continued at intervals on favorable nights, and various exposures were tried, from three minutes down to one-half minute, at full opening (*f*/7.7), the best results being obtained at one and a-half to two minutes. The beautiful fan design, which shows the most delicate spray of all, was made in less than two minutes at *f*/11. Some experiments were made recently while the fountain designs were shown in light green and yellow, but the results were not successful.

"The Music Pavilion next engaged my attention. This subject presented many interesting features, not the least of which was the audience; and which, at the time, I feared might be an insurmountable difficulty in the way of a successful picture. From a point of view previously decided upon, the exposure was made on a calm night about ten o'clock, the audience at the time being interested in a selection by the band, and the result of this first trial was all that could be desired. The duration of the exposure was about fifteen minutes, with stop *f*/22. This picture needs to be studied in all its details to be fully appreciated. I have not seen a night picture in which as large a number of people figured. It is remarkable how little movement is shown. Later negatives of the same subject are even better in this respect.

"No part of this, or any of the other pictures submitted, were made by daylight. All are purely night exposures.

"During these exposures the lens was carefully shielded while the electric launch on the lake was in view, or while any person passed or stopped close to the camera. Persons moving about at a distance make no impression on the plate.

"The plates are developed in a much diluted pyro developer as prescribed for non-halation plates. Development is necessarily prolonged in order to allow time for the developer to penetrate to the under film and bring out the detail. The negatives were not given any subsequent treatment whatever. All the fine gradations were obtained in the regular development.

Lens and Plate

"In my earlier experiments I used a cheaper achromatic lens which barely covered a 5 x 7 plate at *f*/11. In all the pictures submitted I used a No. 4 Goerz, Series III, *f*/7.7, with Seed non-halation plate (6½ x 8½) without backing; and I consider these an ideal combination for this class of work. The superior qualities of both are evidenced by the fine depth and definition secured and the freedom from halation. A study of the electric lights and the finer detail in the woodwork of the buildings, especially where adjacent to strong light, is sufficient. Tests made with other lenses and plates did not yield results equally good.

"Needless to say, a strong tripod is indispensable, one which can be solidly planted and which cannot be swayed by every passing breeze. Many, many failures in this work are due to "featherweight" tripods. A liberal focusing cloth is of course necessary. The camera should have a movable front and should be *perfectly level.*

"'Patience' is not a part of the apparatus, but you will need to have an inexhaustible supply of it in night photography, particularly if you must travel fourteen miles of an evening, as I have done more times than I can remember, to make a few trials, and often go back home without unpacking the camera, because of unfavorable conditions. When you make some exposures, you will have failures, but here is where the patience comes in, and if the picture is worth it, go back again; and when you secure it, you will forget all the difficulties.

"The faculty of observation will help very materially toward successful results. There are local conditions everywhere which cannot be controlled and which must be noted. Choose the most favorable time according to conditions, even if you have to wait weeks. Too much painstaking care cannot be expended from the first preparation to the final stage.

Lenses and Halation

"A writer in a magazine article at hand, commenting on an electric light in a night picture, says: 'It is contended by physicists that there are no rays of light, the appearance of rays being merely the effect of light upon the optic apparatus of the eye.' A fuller discussion of this subject should prove to be very valuable, in view of the different results obtained by various lenses. However, in comparing a number of night pictures made with many different kinds of lenses and plates, it is interesting to note how differently the rays which proceed from the electric light are rendered.

"In the picture referred to, the lamp itself is lost to view in halation, while eight long beams of light shoot out from the center. In some earlier experiments made with an achromatic lens I find only two distinct rays, with a blaze of light around the globes of the arc lights, while with the Goerz lens and Seed Non-Halation plate the halo is entirely eliminated, showing distinctly the edges of the globes; and the emerging rays form a distinct star design. In one recent negative which was somewhat overexposed there appears a clearly defined ring of light about most of the arc lamps.

"Regarding the method of introducing a short daylight exposure into 'night pictures,' I have not in any instance employed it. I have always held it to be not only unnecessary, but illegitimate. I have in mind a picture shown as a 'night view,' in which there were three different exposures. The same scene was afterwards photographed successfully in one exposure at night. The result of the combination exposure is usually a flattened picture, devoid of the atmospheric quality peculiar to night.

"The results obtained in the experiments taken by night exposure only give me every confidence in the possibilities for future work."

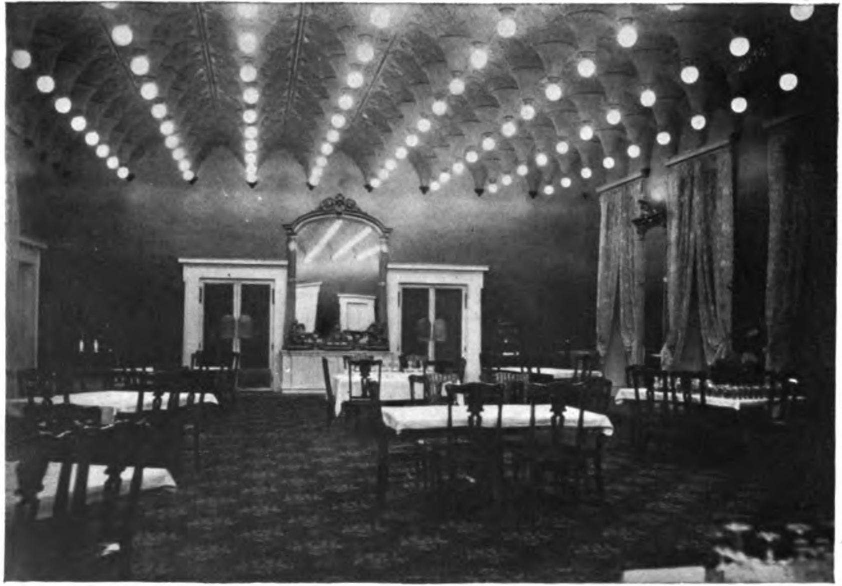
Mr. Ryan has also done fine work in photographing pyrotechnic displays, of which mention is made later.

Magazine Illustration

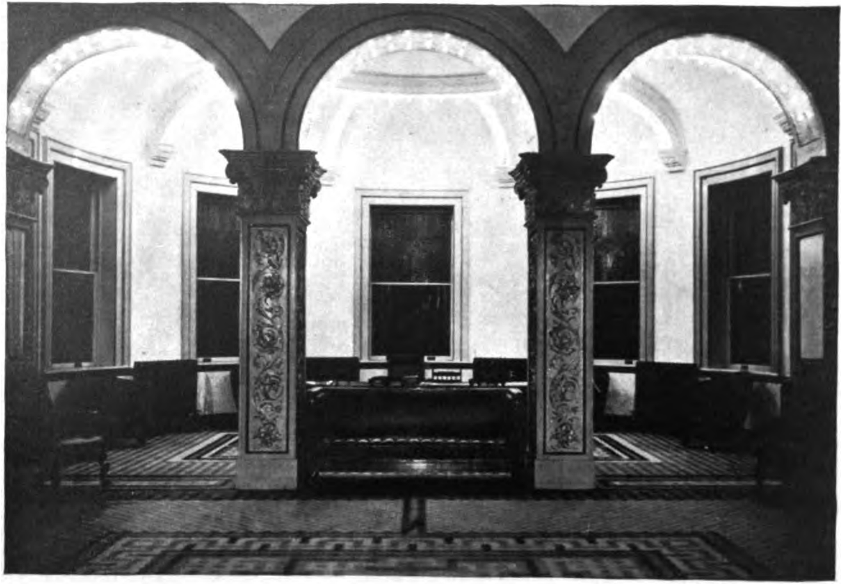
Nothing shows more fully the practicability of photography at night than its use, without special comment, to illustrate magazine articles. The work then stands on its art merits, and the results are not judged as photographs, but as pictures. In 1897 James B. Carrington contributed to *Scribner's Magazine* an article on "Night Photography," illustrated with photographs presented as photographs. In March of 1900, he presented in the same periodical an article entitled "New York at Night," of a distinctly literary and rather contemplative character, very well illustrated with photographs made by himself. I am led to mention the article not only because of its real interest, but because it brings up a rather vexed question—that of whether or not to endeavor to absolutely prevent halation. Some very capable workers insist upon double-coated plates, carefully backed, with which, under most conditions, any source of light less vigorous than an unshaded electric arc may be sharply defined. Others say, and I confess my sympathy with this point of view, that the eye itself sees a halo around any brilliant light at night, and that a certain measure of softening or spreading is not only allowable, but desirable. Thus, Mr. Stieglitz uses double-coated plates, but does not back them.

Backing Plates

One who dislikes the troublesome manipulation involved in the use of double-coated plates as much as I do, will probably back his favorite plate with some efficient absorbent of the superfluous light rays, and obtain the same effect. I am convinced, from the testimony of good workers, that the "E. W. N." backing does the business; and I know from a long experience that the optically correct backing of aurin and erythrosin, dug out of an old annual some years ago, and presented on page 27 of THE PHOTO-MINIATURE No. 13, will do it too. Perhaps the latter backing is *too* good, even though my friend Waugh discarded it in "rich disgust" after apparently trying to make it serve as a shirt dye, and a means of painting the inside of his dark-room in an idle hour; for I have secured a sharp image *of* an incandescent electric light held in my boy's hand, with an exposure long enough to make a portrait indoors on a dull day. Indeed, I have a half-dozen negatives of the sun in partial eclipse, made in May, 1900, upon Cramer instantaneous isochromatic plates, backed with this easily managed and readily-removed compound.



AN INTERIOR BY ELECTRIC LIGHT: I
Percy Rapier Hines



AN INTERIOR BY ELECTRIC LIGHT: II

Percy Rapier Hines

Obviously, halation must be at least partially prevented, and the "gentle reader" may use any means he pleases toward that end; probably nothing will too much restrain the tremendous energy of an unshaded electric arc, toward which the experimenter is sure, one time or another, to turn his lens. None of the pictures illustrating this subject show a bare arc light; Mr. Motteram's exquisite Philadelphia views just miss them on Broad street. To point at the light, and get a tree to shut out the actual central glow of the luminary, seems to be the better plan.

The Pan-American Illumination

With incandescent lights there is no trouble, and the glorious illumination at the Pan-American Exposition offered superb opportunities to the aspiring night photographer. Offered, I said; but an unwise management and a grasping concessionaire interposed, and the limitation of "4x5 cameras only, held in the hand" barred out from this fairy-land those who by instinct and training could have handled the opportunity as it deserved. What a truly lamentable thing it is that this dream of beauty by day and by night should follow Chicago's "White City" into history through the interpretation of a "commercial" photographer. And unless the photographers of the country rise up in wrath and in a hurry, the same inexcusable blunder will be made at the forthcoming St. Louis exposition, and we shall again have to depend on snap-shot hand cameras for our records of a world of beauty well worthy the best efforts of the most advanced workers. A word of praise should be given here to the clever night-pictures secured with a hand-camera at the Buffalo exposition by Arthur Hewitt, and reproduced in *The World's Work.*

Snow Pictures at Night

As will be observed, those who have ventured forth with camera and confidence, plates and patience, have been enamored of the exquisite shadows that hide in street and park when snow has covered the city's blackness and grime. Several of the views show snow effects; notable especially is Prescott Adamson's "A Winter Night," many times honored at exhibitions and salons. Concerning it Mr. Adamson writes: "The picture I send you is a real night scene, the illumination being from electric lights not included in the range of view. Also, it was taken during a heavy snow-storm, which resulted in softening the shadows." It is a model both in composition and in technique. A winter picture sent by an interested reader of THE PHOTO-MINIATURE, and not reproduced, presents beautiful shadows in the snow, but alas! the photographer has set up his camera indirectly in front of a light and a tree, so that the tree's shadow extends its trunk in a straight line vertically off the plate, in the center, spoiling an otherwise excellent composition. Underexposure aids also in creating the idea that the tree has a marvelous length, for the detail in the tree shadow has not been reached at all.

Welsbach Lights: Development

Ordinary illuminating gas, burned in an open flame, gives a yellowish light of very weak actinic energy, but when used through a Bunsen burner to heat to incandescence and consequent brilliance a mantle of certain metallic oxides, the resulting light is very white and of a strong photographic power. None of the interested night workers seem to have made photographs by Welsbach or equivalent lights, so far as I can ascertain, because, perhaps, the preponderance of electricity has been so great. Many interiors have been made by the aid of these lights, and of these I will speak later. Parenthetically, I may mention one notable use of the Welsbach light at night—or in daytime, for that matter—in making prints on any of the developing papers of the bromide class, as Velox, Dekko, Vinco, etc. A Welsbach mounted suitably on a heavy and very low base (I have fitted one into a five-inch iron pipe "plug" with much satisfaction) and connected with the gas main by a flexible tubing, affords an ideal printing light. It is more constant in quality than the average incandescent electric light, and very much more powerful; yet the papers mentioned may be handled and developed with perfect safety close by the light, screened only from its direct rays by a heavy card or other shade. In my own practice, this Welsbach light, so mounted, serves also as a light for developing plates when moved on its flexible tube into a box with a red-glass front

12 x 24 inches in size, and gives in the dark-room a flood of soft, comfortable red radiance, which makes every operation certain, and is perfectly safe for the limited time a plate is exposed to it. I hope (to break into another parenthetical interposition) some one will soon write a treatise on dark-rooms and development that will dispose finally of the old and absurd dictum that has made the place for developing photographic plates truly a *dark*-room by using as an illuminant a more or less smoky and always inadequate little oil lamp feebly shining through a hand's breadth of red glass! Not long since I was put into an otherwise well-fitted dark-room in Connecticut, in which the light was furnished by an oil-lamp with a wick half an inch wide, smoking behind a combination of a deep ruby glass, an orange glass, and a piece of thick post-office paper. By striking a match, one could see where this travesty on a light stood! Surely it was *safe*, but by no possibility could one tell anything about a plate during development. My idea is, and I have held to it for years of work, developing thousands of plates, that one needs plenty of light for the eyes, and mighty little for the plate; and by removing a plate from the holder and putting it into the tray *in the shadow*, and covering the tray *at once* with another tray or a card after pouring on the developer, the brilliant and comfortable light does no harm at all. When it is desired to see the progress of the always fascinating process of development, I hold the tray right up to my Welsbach-lit red glass (it is covered with ruby tissue for diffusion), look at it quickly, and then cover again, and I do not know what it is to have a plate fog from the developing light. But all this is an aside, for which the "gentle reader" is asked to excuse me!

Acetylene

Acetylene gas furnishes a flame of intense whiteness, and of very high actinic power. It is singular that no development of its photographic capabilities seems as yet to have been made. At the Pan-American Exposition the marvelously brilliant acetylene building tempted me sorely, but as my costly permission from the official photographer to photograph plants, fruits and flowers (which he could in no case properly picture) expressly prohibited me from making "any views of buildings or grounds," I could not experiment on this unique subject. Some one who is interested will doubtless develop the acetylene possibilities, and I believe portraiture by night is distinctly within the range of this modern and powerful illuminant.

Pyrotechnics

"Fireworks," or pyrotechnics, would seem, notwithstanding the brilliancy of their light, to present much difficulty in photographing, because of the various colors used, and also because of the brief duration of the display in any one design. Yet, not daunted by apparent difficulties, the amateur long ago attacked this possibility. In 1887 a fairly successful photograph was made by Wallace Goold Levison of a device in fireworks, intended to represent the historic battle between the Monitor and the Merrimac. Concerning it he wrote: "The torrent of fire which the Merrimac appears to be pouring upon the Monitor is the accumulated effect of many Roman-candle balls separately thrown during the fight, each of which in succession has made its impression upon the plate exposed in the camera." The exposure was long and no instantaneous result was even attempted. Later, in 1891, Mr. Levison had improved his practice so that the photographs made showed the clearly defined trajectories of separate Roman-candle balls; and pictures of pin-wheels especially filled with steel filings showed a very distinct and beautiful effect, apparently almost instantaneous.

Progress Made

So much for 1891! By 1901 the sensitiveness of plates and the speed of lenses had improved so that pictures of equivalent displays of fireworks are quite satisfactory, showing nearly full exposures, with the result of detail and atmosphere utterly absent in the earliest pictures, which were mere silhouettes, so to speak. A very fine example is the "Battle of Manila," made at Woodside Park near Philadelphia, by M. J. Ryan, whose beautiful work with electrically-lighted park scenes has been before alluded to. Of the battle scene, reproduced as one of the plates in this number of THE PHOTO-MINIATURE, Mr. Ryan writes: "This was a pyrotechnic display on the lake on Woodside Park, designed to represent the famous naval engagement of May 1, 1898. The miniature ships, charged with rockets, were anchored in the lake, while on the opposite shore were improvised forts from which detonating bombs were discharged. The camera was focused sharply on the ships, and with full opening (*f* 7.7) the exposures commenced immediately the firing began, and continued throughout the display, which lasted about four minutes. The resulting picture was indeed a surprise, and will speak for itself. The perfect impression of single rockets upon the plate, notably the one exploding in mid-air, is worthy of much consideration, from the fact that the flight of a ball from a Roman-candle is of such short duration. The impression was practically instantaneous."

Another interesting fireworks picture shown this month is the work of Percy Rapier Hines and represents also the "Battle of Manila," as depicted in Centennial Park, Nashville. Here again is evidence of a practically instantaneous exposure. Mr. Hines tells of the making of the picture as follows: "The negative was made in May, 1899, with 5 x 7 telephoto Poco A, rectilinear lens, at *f*/8. The lens was opened a second or two before the fireworks were set off, a sharp focus having previously been obtained by means of some rockets and Roman-candles that were set up. The lens remained open during the progress of the fireworks, the time being about one second. The first exposure was on the rockets and bombs on the right of the picture; then when the set piece, representing the battle of Manila, as shown on the left, was set off, the lens was again opened during the progress of the firing of this piece, which accounts for the smoke from one of the front pieces partly obscuring one of the ships in the distance. The plate was a Cramer Crown, and it was developed in a normal pyro-soda developer."

Interiors at Night The making of photographic interior views at night is well withn the province of flashlight work, as set forth in No. 29 of THE PHOTO-MINIATURE, and is also fully treated in No. 30. Yet there are some results, practical, picturesque and valuable, attainable by night exposures on artificially lighted interiors, that are hardly practicable by the use of magnesium powder. Years ago, in the days of the original "No. 1" Kodak, I remember an attempt with it on the court of the Astor House in New York. I opened the lens about 11 P. M., resting the little camera on the window sill, facing across the gas-lighted court. Just before daylight, I woke up and closed the lens. The resulting film negative was not quite fully exposed, even after about five hours of light action, probably because the lights in the court were mostly turned off after midnight.

Later, and with a 5 x 7 camera, I made another attempt at night-photography on an interior, supplementing the gas flame with two powerful kerosene lamps, the object being a Christmas tree. An exposure of an hour gave a very good negative. This whole matter, however, is so well covered in last month's PHOTO-MINIATURE above mentioned, that I can best refer the worker to the very full and excellent discussion of the possibilities of gas, in various combinations with other sources of light, there presented.

Electric Light

Electrically lighted interiors have interested some capable photographers. Two plates in this number are credited to Percy Rapier Hines, before mentioned as the maker of a fireworks picture, and they are very good examples of what can be done with incandescent illumination. Together with his father, Richard Hines, Jr., Mr. Hines has devoted much attention to the photographing of brilliantly lighted and elaborately decorated show windows. Concerning the details of this work, and other night-photography, the elder Mr. Hines sends the following:

"To begin with, my greatest annoyance has been in the unaccountable reflections, many of which you will notice in the prints. In photographing show windows there are certain reflections which cannot be gotten rid of except by means of local reduction. I have done my best to locate the cause of these reflections by moving my point of view, and by shading the lens, but to no avail, as I have not yet been able to locate the cause of the trouble.

"Print No. 2 is of the Battle House dining-room.* It is about the hardest technical proposition I have yet encountered. The carpet on the floor has a deep red ground with yellow figures. The walls are of a somber effect, beginning at the bottom in a red that is almost black and shading lighter toward the top, which is of a rose color. The lights are enclosed in globes of greenish tint, somewhat milky and opalescent. This had twelve minutes' exposure with a lens of 8¼ inches focus. This negative, together with Nos. 3 and 4, took me two hours and a half to develop. I began development in a developer with one-fourth grain of pyro to the ounce. After some time the high lights came out in this developer, but the lower half of the plate was pure white, without a sign of detail. I then increased the strength of the developer for the lower half of the plate and used a swab of absorbent cotton filled with a 10 per cent of bromide on the upper half, doing this alternately while holding the plate in my hand, and then returning it to the pyro-soda developer (of about one-half grain pyro to the ounce). This method of development was kept up on each of the plates till I had coaxed out all the detail I thought it possible to get, when I rocked them once or twice in a normal pyro-soda developer to get density, then fixed and washed them. They have given me encouragement, but they are not what I am after, and I shall try again. They print unevenly, due to the greater amount of density in the upper half of the negative. These three negatives were made on Cramer non-halation plates backed with Anti-halo.

Show Windows

"Another attempt was upon an illuminated show window in a jewelry establishment. It was gotten up to represent a cavern with a dragon at the mouth. The dragon was of bronze with wings of silver scales, studded with incandescent lights, with red electric light for a tongue and two green ones for eyes. The window was filled with cut glass and statuary. The upper part of the window represented the upper part of a cave, with stalactites hanging down, each tipped with a tiny incandescent lamp. The exposure was five minutes, with the single lens of a rectilinear combination, at full opening. The development was pyro-soda, tentatively used, and the high lights restrained by the local application of bromide.

---

*Reproduced in this number.—EDITOR.

"The developer we have used during our four years' experience in amateur photography is a pyro-soda, compounded as follows:

"ALKALI SOLUTION

"Water	10 ozs.	
Seed's sulphite soda	1 oz.	(crystals 2 ozs.)
Seed's carbonate soda	1 oz.	
Potassium bromide	30 grs.	

"This forms a stock solution. For the normal developer we compound as follows:

"Water	5 ozs.
Alkali solution	1 oz.
Dry pyro	12 grs.

"We have found this to be as flexible a developer as any one could wish, and it has the advantage of getting all the energy out of the pyro because it is added in the dry state. For tentative development we dilute it with an equal bulk of water or even add ten ounces of water if the necessities of the case seem to demand it."

The hints given by Mr. Hines will be valuable to those who take up a difficult branch of photographing, in which there are great possibilities. I have often wondered that so little has been done in photographing show-windows at night, because these often present very beautiful subjects, and it would seem that there might also be pleasant commercial possibilities in successful work of the kind.

Development

The general subject of development of night pictures has been touched upon here and there throughout this rambling essay. It is apparent to the reader that normal development can seldom, if ever, be given to negatives which have been exposed to the very harsh contrasts of light characteristic of most attractive night effects. As detail in the shadows is exceedingly hard to obtain under circumstances of deficient general illumination, it follows that excessive, or even normal, density in the high lights must be guarded against. In a good night-picture there will be much apparently clear glass in the shadows when the negative is held up before an unshaded light, and there ought to be no very strong high lights, save in the cases where the lens has been pointed directly at some sort of a light. Let me caution the novice against discouragement from these apparently clear shadows; for upon drying and printing, fine detail will very often appear where there seemed little to warrant its expectation just after the negative was fixed.

The developer used, then, must be weakened, in order to prevent too rapid action on the high lights whatever may be its composition. I will venture the heretical statement, too, that it matters but little what is the reducing agent, if only it is properly managed, for though I have a favorite developer—a "mixture" which excites the risibles of my good friend Waugh, while it helps me to get some fairly decent negatives—I have long since arrived at the conclusion that all the modern agents have the same ultimate effect, both as to developing power and as to density. It is only a matter of experience, alkali, sulphite and time, and if one is able to handle his chemicals, he can get solid density with metol or even with the hasty amidol, and thin negatives with hydrochinon and adurol.

Therefore, while I am sure my aforesaid friend and associate, Waugh, would have a special prescription of tolidol, compounded in the dark of moon, for each separate form of night picture he would make, and would get delightful results in the negatives as well as with his "gum" prints of bi-chromated water colors, I will still recommend the reader to keep right on with his old favorite developer on his old favorite plate. Let him simply back the latter with some non-actinic or light-absorbing smear, and weaken the former with *cool* water, and he will be ready to get all the results his patience is equal to.

If the last faint line of detail is wanted, the well-known system of "tentative" development must be resorted to and this means cool and weak developer (to prevent fogging from temperature—60° Fahr. is safe, for trays and developer) with a little excess in alkali, renewed every five or ten minutes, with the plate carefully covered from light every second of the time when it is not undergoing the brief examination necessary to see the progress of the work.

Then when all the detail has been worked out, a few seconds' immersion in stronger developer, to add a little density all over, and the anxious worker will have done all he can. If he is skilful with a brush, he may try painting with bromide and with stronger developer; but not many of us are water-color artists, and I always look with suspicion on the camel's-hair brush suggestions! A little missionary work with a pencil on the negative after it is dry is much simpler and much safer.

Printing Methods

The night picture may be printed on any paper, of course, but most of the succesful workers seem to use platinum, velox, or some other paper giving black and white effects. One friend who has done some exquisite things swears by Aristo-platino, claiming that with it he can print deeper without losing detail in the shadows. In this connection, I may well give a means of reducing contrast taken from a letter written by Mr. Heyl. He says:

"Halation cannot be avoided when there are strong sources of light in the picture, but a successful method of printing so as to lessen the exaggeration of light is as follows: Make a deep print from the negative, preferably on a developing paper, finish and dry. Cut off the white margin caused by the printing-frame, along the two long sides, leaving the print with a margin at top and bottom. Lay this print face down in an open printing-frame, place the negative film up in the frame on top of the print, hold the frame up to the light and *register* print and negative as nearly as may be. Now carefully, without disturbing the negative, put in a sheet of printing paper and close the back of the frame. Expose for several minutes (by artificial light), the light reaching the printing paper through the light portions of the print in front and through the negative.

Carefully pull out the print from in front of the negative, the tension of the back spring keeping the negative and printing paper from slipping and finish the exposure through the negative alone, giving it several seconds."

Finis! In conclusion, I may be permitted to express the hope that these hints, disjointed as they necessarily are, will serve to inform some ambitious amateur as to what has been done, so that he may excel all previous efforts in the practice of photography at night. To those who have helped, by suggestion or illustration, in the telling of the story, my sincere thanks are given.

J. HORACE MCFARLAND.

BOOKS

The only book dealing with the subject is *Photography at Night*, by P. C. Duchochois (1893). This deals with gas and magnesium or flashlight photography indoors for the most part, and apart from its historical interest does not directly touch the work referred to in the foregoing monograph.

NOTES

We must ask our readers to restrain their encouraging impatience concerning the delay in the publication of THE PHOTO-MINIATURE. The difficulty in the way is one which, thus far, money, genius, and all the other "powers that be" have failed to solve. Whether we will ever reach the goal of our ambition—the one every thirty days schedule—cannot be foreseen. This much is certain, however, that we will publish the little monographs as quickly as they can be prepared for press. As it is, we can now promise that the November and December numbers will both be published before the year ends. The November number will include a monograph on *Defects in Negatives: Their Causes and Remedies*. The December number will offer a little book wholly devoted to *The Dark-Room*. These are interesting subjects and, unless we are mistaken, the makers of THE PHOTO-MINIATURE have handled them in a very satisfactory way.

❧

The Fourth Philadelphia salon opened its doors at the Pennsylvania Academy of the Fine Arts, Philadelphia, November 18, and will remain open to the public until December 14. We hope to report it from a personal point of view in a later issue. Meanwhile interested visitors and the press have given us the most favorable impressions. Our readers are doubtless aware that, since the closing of the salon of 1900, certain reforms in the management have been effected in answer to fairly general complaints about the conduct of the second and third salons. The exhibition now open is, therefore, doubly interesting as representing the ideas of the "reform" party. While THE PHOTO-MINIATURE openly protested against the methods employed by certain members of the "reform" party in

ANTI-TRUST

PURE
COLLODION
PAPERS

MONARCH MATTE

MONARCH

TRADE MARK

MONARCH GLACE

RELIABLE
UNIFORM
PERMANENT

Three times quicker printing than any other

Prices same as other Collodion Papers

MANUFACTURED ONLY BY THE

MONARCH PAPER COMPANY

E. & H. T. ANTHONY & CO.
SOLE TRADE AGENTS
122-124 Fifth Avenue : NEW YORK

ANTI-TRUST

Kindly mention The Photo-Miniature

their endeavors to bring about the change desired, we have been equally open in expressing the opinion that reform or reconstruction of some kind was essential to the continued usefulness of the Philadelphia Photographic Salon as an institution worthy of generous praise and support. For this reason we are glad to record the apparent success of the salon under its new management. The present exhibition is, without a doubt, broader and more generally acceptable to the body of photographic workers than former salons in its presentation of the pictorial possibilities of photography. We are especially glad to see among the exhibitors so many professional workers, and so large a proportion of foreign photographers. Herein the "reform" party, however questionable its methods, is largely justified—which is written without any pretence that "the end justifies the means."

❦

Concerning the salon as a whole, the Philadelphia *Press* says: The jury of selection is made up of Mr. Charles I. Berg, Miss Frances B. Johnston, Mr. Allen Drew Cook, Mr. George W. Hewitt and Dr. Herbert M. Howe. A better arrangement for securing a comprehensive exhibition than this union of an art academy and a photographic society could not be devised, as previous exhibitions have shown and this emphasizes. For the first time, foreign photographers in a considerable number have presented themselves in competition, twelve from England, against one last year. The Committee of Selection is this year, it is true, less fully represented. Last year, after accepting 110 exhibits, the Committee of Selection placed fifty of their own works on the walls, a dubious and indefensible proceeding. This year the committee is modestly represented and the entire number exhibited is 281. Last year the number was 204.

The result is immediately apparent in an exhibition no longer confined to one narrow type, excluding any other artistic product of the camera. Instead, without departing one whit from the foundation principle that nothing shall be admitted which has not added to

CRAMER'S

Isochromatic

Plates

ARE THE MOST PERFECT COLOR-SENSITIVE PLATES ON THE MARKET

◆

Made in Three Grades of Speed:

SLOW, MEDIUM and
INSTANTANEOUS

◆

For Sale by all Dealers in Photographic Supplies

◆

Manufactured by

G. Cramer Dry Plate Co.

ST. LOUIS, MO.

OFFICES IN

NEW YORK, No. 32 East 10th Street
CHICAGO, Room 705, Cable Building
SAN FRANCISCO, Room 38, No. 819 Market Street

Use Mallinckrodt's Sodium Sulphite Anhydrous
Absolutely Pure for Photographic Purposes

the chemic and mechanic of the photograph, the touch of the artist, the walls are no longer limited to one dusky, shadowy or mannered way of securing this touch. Some names are absent which one would be glad to see present; but new names, new work and new effects more than make up for their absence. No impartial stranger could difference the admirable exhibition now made from the admirable ones that have preceded. In an exhibition, as in all other of the co-operative labors of man, abstention may, to certain temperaments, be a personal solace; it is never a logical, legitimate or convincing argument of superiority. If, as was alleged of this exhibition, its standard was to be lowered, the best possible proof would have been the comparison of better work, but as a matter of fact, new names have supplied thought of the old and the exhibition is on a level with the past.

The exhibition as a whole shows the movement, now familiar, towards soft and continuous gradation in landscape, subtle contrast in heads rather than exact definition, and in the handling of the figure a perpetual attempt, often successful, to place the subject within and behind the frame, instead of on the surface,—a method which Whistler first fully made clear in art, in models which have influenced the entire field of photography. There is this year less that is unusual and more that is successful than in recent exhibitions. In art, nothing is gained by exciting surprise and everything by achieving results.

◆

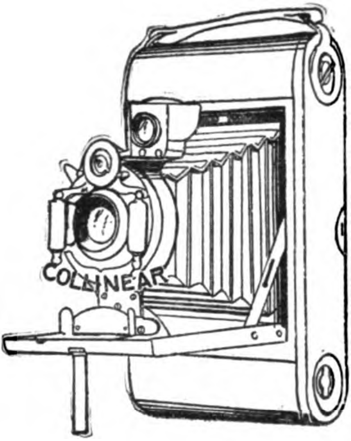
The manufacturers of "Rotograph" bromide paper have just placed on the market their negative paper, as a substitute for dry plates and celluloid films. This negative paper is well known in Germany, and will doubtless win great popularity on this side of the Atlantic. It shows no grain or fiber structure, is tough, and so thin that prints may be made from either side of the negative without loss of definition or necessity of oiling or waxing the negative. In speed it is equal to a dry plate of fair rapidity, and it has, of course, advan-

THE COLLINEAR

SERIES II. F 5/6

can now be fitted to the

POCKET FOLDING KODAK No. 3



No. 3 Pocket Folding Kodak, with **COLLINEAR II, No. 2** and Unicum Shutter . . . $62.00.

COLLINEAR LENS and Shutter only . . . $48.00.

COLLINEAR, Series III, fits

	LENS AND SHUTTER
No. 2 Folding Pocket Kodak	$38.00
No. 3 " " "	$38.00
	LENS
No. 3 Cartridge Kodak	$40.00
No. 4 " "	$40.00
No. 5 " "	$50.00

A COLLINEAR, Series III
doubles the speed of your Kodak
COLLINEAR, Series II
quadruples it.

Sold by all dealers at uniform prices. For descriptive circular C, write to

VOIGTLAENDER & SON OPTICAL CO.
137 West 23d Street : New York

tages in weight and price. Negative paper may be obtained in cut sizes or by the yard.

The Rotograph Company also announces a new brand of bromide paper, "Imperial Rotograph." This is a heavy-weight, cream-tinted paper for large prints where rich, broad effects are desired. [Rotograph, 101 Fifth ave., New York.]

◆

The C. P. Goerz Optical Works announce their readiness to fit their new plate attachment to the No. 3 F. P. K., by which means the possessor of the Folding Pocket Kodak No. 3 can use either plates or films, as may be desirable. An illustrative descriptive circular can be had on application. [C. P. Goerz Optical Works, 52 Union Square, New York.]

◆

A German scientist has measured the time occupied by a wink, by means of a specially arranged photographic apparatus. A piece of white paper was fixed to the edge of the eyelid for a mark. He found that the lid descends quickly and rests a little at the bottom of its movement, after which it rises, but more slowly than it fell. The mean duration of the downward movement was from seventy-five to ninety one-thousandths of a second; the rest with the eye shut lasted different periods, the shortest duration being fifteen-hundredths of a second with one subject, and seventeen-hundredths with another, and the third phase of the wink, the rising of the lid, took seventeen-hundredths of a second, making the entire duration of the wink about forty-hundredths, or four-tenths, of a second.

◆

According to the *Photographic Dealer* (London), Fritz Hansen has written a work on the trade in photographic materials. *Inter alia*, he states that German manufacturers of dry plates have driven the English and Belgium makers from the German market, and Germany now exports two-thirds of what she makes. She is rapidly effecting a similar result in respect to photographic

EXPERTS

who have tried our Landscape and Portrait Orthochromatic plates pronounce them equal in quality to the old-time "wet plates." No higher praise can be given a dry plate—

They are also just right for the rendering of correct color values.

Order of your dealer, or write us and we will see that you are supplied.

M. A. SEED DRY PLATE CO.
ST. LOUIS, MO.: 2005 LUCAS PLACE
NEW YORK, N. Y.: 57 EAST 9TH STREET

Kindly mention THE PHOTO-MINIATURE.

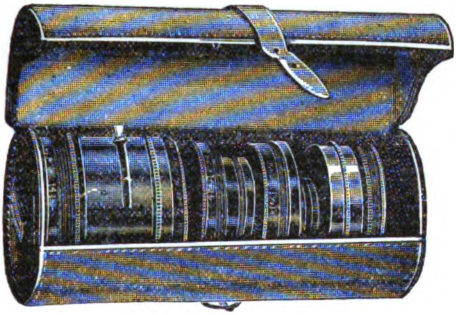
paper and has, so to speak, thrown the once unsurpassed American paper out. All civilized countries get nearly all their photographic chemicals from Germany, and as to the optical element of the trade, she rivals other countries, at all events, in better qualities. The writer of the article thinks Germany could flood America if the duties were reduced. In this connection, it is interesting to notice that the representative German manufacturers of photographic materials and accessories are busy interviewing the German Minister of Commerce on the subject of the new customs tariffs.

◆

The forty-sixth annual exhibition of the Royal Photographic Society, held at the new gallery, London, September 30 to November 2, is spoken of as one of the most satisfactory of the series. It would be folly to attempt an adequate review of the show in these pages, but a complete and fully illustrated critique may be seen in "Photograms of the Year," 1901, which will be ready in a few weeks. The American exhibitors are C. Yarnall Abbott (3 pictures); A. L. Coburn (1); Miss Essie Collins (5); F. Holland Day (2); Dr. F. Detlefsen (3); R. Eickemeyer, Jr., (1); F. Eugene (2); Herbert G. French (1); Arthur Hewitt (9); Dudley Hoyt (1); H. C. Rubincam (2); George H. Seymour (1); E. J. Steichen (6); Miss Mathilde Weil (6); and Arthur W. Wild (1). This is not a big showing for American workers, considering that the total number of exhibits is 583 from 263 exhibitors.

The average of quality, pictorial and technical, is spoken of as distinctly higher than at any previous exhibition of the Royal Photographic Society, which is hopeful. As far as printing methods are concerned, it is interesting to note that out of a total of 583 prints, 143 were platinum; 128 were carbon; 101 were bromide; 21 were gum-bichromate; 8 were ozotype; and the rest collodio or gelatino-chloride, collotype, photogravure, etc. Comparing this record with former exhibitions, the use of platinum paper shows a decline, while carbon and its allied processes show a steady increase. The glossy silver print would seem to be out

ROSS' LENSES



The Most Perfect Lenses in
Light and Elegant English Mounts

ROSS' SYMMETRIC ANASTIGMATS
ZEISS' PLANAR AND UNAR LENSES
ZEISS' CONVERTIBLE PROTARS
GOERZ'S DOUBLE ANASTIGMATS
REVERSING PRISMS, MIRRORS
INSTANTANEOUS SHUTTERS, Etc.
HAND AND STAND CAMERAS
SCIENCE AND ENLARGING LANTERNS, Etc.

Catalogues Free

Awarded the GRAND PRIX, Paris, 1900

ALSO TELESCOPES, FIELD GLASSES, ETC.

Sold by Leading Dealers Everywhere

ROSS, LTD., MANUFACTURING OPTICIANS
Contractors to H. M. Government
111 New Bond Street, LONDON, W., ENGLAND

Kindly mention THE PHOTO-MINIATURE

of favor, being represented by seven prints only. The number of bromide prints accepted is almost double that of any previous year.

Seven medals were awarded, five in the Pictorial Section and two in the Technical and Scientific Section. No American worker was medaled this year. We are glad to see that Mr. William Gill's work received the recognition of the Society.

❧

The ninth annual exhibition of the Photographic Salon, held at the Dudley Gallery, London, September 20 to November 2, is also favorably spoken of as quite equal to the salons of former years. Two hundred and eighty-four pictures were accepted, America being represented by F. Holland Day, Alfred Stieglitz, Joseph T. Keiley, E. J. Steichen, R. Eickemeyer, Jr., Frank Eugene, Eva Lawrence Watson, Gertrude Käsebier, Clarence H. White, J. Ridgway Moore, Mathilde Weil, T. O'Conor Sloane, K. S. Stanbery, John G. Bullock, T. M. Edmiston, G. A. Stanbery, A. Pilsbury, Ema Spencer, C. Yarnall Abbott, W. B. Dyer, Arnold Genthe, .Edmund Stirling, and A. H. Stoiber. The pictures are priced in the official catalogue as ranging from $1.80 to $100, the latter figure opposite "The Manger," by Mrs. Käsebier. We note with satisfaction that Mr. J. C. Strauss, of St. Louis, secures recognition, the first American professional to win this honor

❧

While speaking of the London Salon, we may mention, as interesting to readers of the monograph in this issue, that the Salon catalogue contains a reproduction of a landscape in Norway illuminated by the midnight sun. The photographer was Mr. Aubrey C. Blond, the famous mountaineer and photographer.

❧

The Kodak Trade Circular for September contains a correction of certain misleading statements made concerning the patent rights involved in the manufacture of rollable films. This should be seen by those interested.

J. Hauff's Ready Tubes
SAVE MONEY, TIME AND TROUBLE

ORTOL TUBES Sample Set, 35c
A two-solution developer for plates, papers and films

PYROL TUBES Sample Set, 25c
The best two-solution pyrogallic acid developer

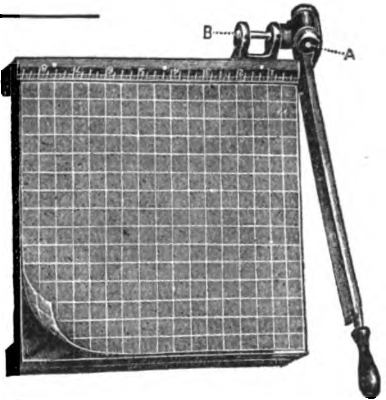
J. HAUFF'S PATENTED DEVELOPERS
Metol : Ortol : Adurol : Glycin : Pyrol

BE SURE TO USE
GG Chemically Pure Sodas

Can you afford to take any chances with expensive and difficult exposures? No, you require the purest chemicals. Washing soda and inferior sulphites will not make a proper developer. Take no chances, but use

GG CARBONATE OF SODIUM ANHYD. CP, 1-LB. BOTTLE, 25c
GG SULPHITE OF SODIUM ANHYD. CP, 1-LB. BOTTLE, 30c
GG CARBONATE OF POTASSIUM ANHYD. CP, 1-LB. BOTTLE, 35c
ALL ARE DOUBLE STRENGTH

STEVENS . . .
PRINT TRIMMER



Special Features

Swinging knife, which insures constant contact and clean clear edges.

Transparent guide sheet to bring edges parallel to any of the lines in picture.

8½-INCH KNIFE, $3.00

NEW CATALOGUE JUST OUT
Copy for 10c in stamps

G. GENNERT 24 and 26 East 13th St.
NEW YORK

Kindly mention THE PHOTO-MINIATURE

Copies can doubtless be obtained on request. [The Eastman Kodak Company, Rochester, N. Y.].

❧

The first shipment of "Photography for the Press" was exhausted as soon as received. We have a new supply on hand, and can now fill all orders promptly. Price, fifty cents. Although written for British photographers, this manual offers much information for all photographers desiring to sell their work to newspapers and periodicals.

❧

Woodland and Meadow. Out-of-door papers written on a New Hampshire Farm. By W. I. Lincoln Adams. 123 pages, 7½ x 10; illustrated. Net, $2.50.

Like "Sunlight and Shadow" and "In Nature's Image," by the same author, this work is a sumptuously printed and illustrated volume, eminently suitable for holiday gift purposes. Mr. Adams, for some years editor of *The Photographic Times*, is a skilful photographer, and his pictures of farm-life in New Hampshire add charm to the little essays on life out-of-doors which make up the book. [The Scovill & Adams Company, New York.]

❧

An Important Correction. By an error in reading "copy" the advertisement of Mellen's Panoramic Printing Frames in our last issue gave the price of these frames as $1, instead of $2. The Mellen Panoramic Frame is for printing panoramas by combining several small negatives on one strip of paper. It is a useful and well-made article, and is very reasonably priced at $2. [Mellen Manufacturing and Publishing Company, 90 Fifth avenue, Chicago].

❧

We are informed that the edition of *Lloyd's Photographic Encyclopedia*, 1901, is almost exhausted. Readers of THE PHOTO-MINIATURE who have not secured a copy of this useful reference book for their work-room

Bausch & Lomb

PLASTIGMAT f/6.8

The Perfect Photo Lens

Plastigmat *f*/6.8 represents the latest and highest achievements of the optician's art. It was designed with all the requirements of photography—pictorial, mechanical and optical—in view, and it meets the requirements.

It is a symmetrical anastigmat of longer focus than those heretofore produced, giving superior pictorial effect. It can be fitted to any camera and takes any shutter between its combinations. The anastigmatic and other corrections are perfect, and its speed is all that is required.

The single combinations are free from astigmatism and give pictures twice the size at same distance, or same size at twice the distance, at snapshot speed.

There is no symmetrical anastigmat equal to it

SPECIMEN PICTURES ON REQUEST

Bausch & Lomb Optical Co.

NEW YORK : ROCHESTER, N.Y. : CHICAGO

Manufacturers of the World-Famous

Bausch & Lomb Zeiss Anastigmat Lenses

in Seven Series

Catalog Free

should do so without delay. It is a volume of over 400 pages, containing practical papers on photographic manipulation and other good things, and can be had by sending 20 cents to cover postage. [Andrew J. Lloyd & Co., 323 Washington street, Boston, Mass.].

◆

One of the most delightful hand-camera views we have seen for some time, a bit of open landscape with sunlit clouds and a wonderful range of tone throughout the planes, comes to our table as a demonstration of the value of Forbes' orthochromatic plate, used with the new Forbes color screen. Full particulars of these specialties can be had from the Forbes' Dry Plate Company, Rochester, N. Y.

◆

G. Gennert, New York, sends to our table a new catalogue of 176 pages, well arranged, neatly printed and illustrated, comprising a complete list of his own photographic specialties and those of other manufacturers whom he represents in this country. The book affords a handy guide to many of the best photographic helps of today, and should be filed by all who desire to keep themselves well informed. A copy may be had by sending 10 cents to Mr. Gennert—this charge merely covering the postage on the book.

We note that Mr. Gennert has undertaken the sale of one of the best English lantern plates, the Imperial brand. These have not hitherto been obtainable in this country, although very largely used by amateurs on the other side of the Atlantic. The price, 55 cents per dozen, is identical with that usually charged for American makes.

The Stevens trimming board, recently introduced by G. Gennert, is another novelty deserving of mention here. At present this is obtainable only in one size—for prints up to 6½ x 8½, the size most generally useful. The board has a swinging knife of special design, which is in constant contact with the cutting edge, and yields a clean cut besides being self-sharpening. Another novel feature is a ruled transparent sheet

Trade Mark

Actien-Gesellschaft für Anilin-Fabrikation, Berlin S. O.
Photographic Department

Manufacturers of:

IMOGEN, Patented

The Latest Novelty in Developers

Can be obtained of all dealers.

Prices:	1 oz.	4 oz.	8 oz.	16 oz.
	$0.37	$1.20	$2.10	$3.95

IMOGEN is particularly adapted to the modern highly sensitive plates.

IMOGEN works clearly and brilliantly.

IMOGEN produces all the gradation, from density to fine detail, the resulting negatives being therefore of the highest grade.

IMOGEN is not much affected by ordinary variations in temperature.

IMOGEN does not injure the fingers.

IMOGEN answers very well for "stand-development."

IMOGEN answers for development of lantern-slides.

IMOGEN " for development of diapositives on gelatino-bromide plates.

IMOGEN " for development of bromide papers, etc.

EIKONOGEN ★ AMIDOL

RODINAL ★ DIOGEN

Pamphlet on Developers (2d edition 1900)

containing in 20 pages detailed descriptions and instructions for use

——— **Free on application** ———

through all dealers or through the following importers:

E. & H. T. ANTHONY & CO.
122 and 124 Fifth Ave., 17th and 18th Sts., New York

MALLINCKRODT CHEMICAL WORKS
St. Louis, Mo., and 90 William Street, New York

THE SCOVILL & ADAMS CO., OF NEW YORK
3 and 5 West 19th Street, New York

GEO. MURPHY, 57 East 9th Street, New York

G. GENNERT, 24 East 13th Street, New York

Universal exhibition Paris 1900: Gold Medal

attached to the board and covering the print, a great convenience in trimming to size.

Pyrol tubes, containing Hauff's Pyrol, are another new introduction. These, like Hauff's Ortol tubes, are arranged in sets of two, a soda cartridge and a Pyrol tube. One set makes 60 ounces of developer. This may be recommended as one of the most convenient and efficient development aids open to amateur and professional workers.

❧

A very dainty Christmas booklet has been issued by the Blair Camera Company, Rochester, N. Y., listing the many good things they offer for holiday trade. Those in search of desirable gifts for Christmas and the New Year should not overlook the inexpensive but thoroughly attractive cameras described in this booklet. Copies may be had from all dealers or direct from the Blair Camera Company.

❧

Mr. C. Yarnall Abbott, of Philadelphia, whose work has this year been accepted and hung at the exhibition of the Royal Photographic Society, the London Salon, the Philadelphia Salon, and the Chicago Salon, has had the further honor of being elected to membership in that exclusive body of pictorial photographers, the Linked Ring. We congratulate Mr. Abbott upon his success. which is well deserved.

❧

In a recent issue of *Photographische Rundschau*, Dr. Hauberrisser contributed a suggestive paper on the Japanese method of coloring lantern slides, concerning which method speculation has been rife for some years. They use soluble aniline colors, but no marks of the brush can be seen, even after careful examination. Dr. Hauberrisser states that after a number of experiments he found that a 25 per cent solution of mucilage, to which the dyes are added, gave a uniformly covered surface, without dark edges, when flowed on to a level glass plate. The solution is prepared by placing 125

Subject to no restrictions of Trade, and thus available to *all* dealers throughout the country, ROTOGRAPH NEGATIVE PAPER, in cut sheets from the smallest to the largest sizes, is bound to have an immense demand among both the beginner who desires to save expenses, and the more advanced photographer who works in large sizes and uses rough platinum, carbon and gum paper for his printing media.

Explicit directions in each package

We are now ready to quote prices and send circulars regarding this new product.

"Rotograph"

101 FIFTH AVE., NEW YORK

B. RUSEGGER, E. S. MAPES
Selling Agents

parts of gum arabic in a linen bag, and suspending it in 400 parts water. After a few days the gum will dissolve and the solution is then filtered, and water added to make it up to 500 parts. About ten parts of glycerine are added, together with a little antiseptic, such as carbolic acid or thymol. The dyes recommended are as follows: Olive-green, light and dark; naphthol red, methylene blue, methyl violet, negrosin, yellow, carbazol yellow. The slide, when being tinted, must be horizontal and illuminated from underneath. A simple apparatus can readily be devised for this purpose made in the form of a retouching desk, but with the carrier in a horizontal plane instead of in the sloping position as usually supplied. After making the various solutions of the correct colorings, the gum is applied as a thick film. If the color is too deep, it is diluted with the mucilage and not with the water. The reason for this is to prevent the solution from being made so weak that it will run about on the film of the slide. It is also recommended to apply the various liquids in drops so as to prevent air bubbles, and one part should not be colored until the portions adjoining are perfectly dry. One solution can be applied over another, but the first must be perfectly dry before doing so. It is better to flow over the plate a solution of albumen, and allow it to dry, before attempting to apply a second coat of color.

❧

The International Annual of Anthony's Photographic Bulletin. Vol. XIV for 1902. Edited by W. I. Scandlin. 353 pages, illustrated, 6x8¾x¾. E. & H. T. Anthony & Co., New York.

The *International*, ample in girth and as attractively illustrated as ever, is the first of the annuals to reach our table this year. A pleasant hour spent among its pages tells us that it is one of the best of its series — a series always notable for quality. The titles of a few of the illustrated papers will indicate the interest of its contents more satisfactorily than mere complimentary phrases can do. Shells and Shell Photography (Shufeldt); Photo-Macrography with a Camera (Walmsley); Home Photog-

JUST OUT

A Plate Attachment

FOR NO. 3 FOLDING POCKET KODAK

HAVE ONE FITTED TO YOURS

Enables you to focus the picture on the ground-glass and to use both Films and Plates. ***Practical. Reasonable.*** We also fit our celebrated DOUBLE ANASTIGMAT LENS to this Kodak. No. 3 Folding Pocket Kodak, with GOERZ LENS, Tib Automatic Shutter and Plate Attachment, with six holders, complete, $62.80, *net* cash. PLATE ATTACHMENT AND SIX HOLDERS, $7.65, *net.*

Write for Catalogue and further information to your Dealer, or

C. P. GOERZ

Optical Works

52 E. Union Square, New York

Kindly mention THE PHOTO-MINIATURE.

raphy (Clarke); Scale of Measurement in Photographic Work (Bradford); Perspective in Architectural Photography (Delery); The Permanance of Negatives (Chapman Jones); Blue Tones on Platinum (Jos. F. Smith); The Photographic Convention of the United Kingdom (Mrs. C. W. B. Ward); Child Photography (Grace Cook); Stereoscopic Photography with the Hand-camera (Elliot). The full-page pictorial supplements are varied in subject and include examples of the work of W. G. C. Kimball, F. G. Shumacher, Frederic Colburn Clarke, Grace Cook, George E. Tingley, W. N. Brenner, W. H. Partridge, Henry Troth, J. C. Strauss, D. D. Spellman, B. J. Falk, J. H. Field, Alfred Holden and others equally well known for good, straightforward photography.

❧

The remarkable results achieved by Mr. A. Radclyffe Dugmore in photographing living fish have drawn attention to the possibilities of this peculiarly difficult field for the camera. In a recent issue of *Der Amateur Photograph*, Dr. E. Bade, an eminent authority on fresh water fish, and a clever photographer, gives a few valuable hints from his practice: "Ordinary fish are photographed through the plate-glass side of an aquarium. Apart from rapid lens, highly-sensitive plates, a rapid shutter, and other necessities in respect to which the moderately thoughtful photographic practitioner can scarcely fail to do what is necessary, there are other considerations of high importance, and yet these are very often neglected. An aquarium with a large surface area of water upon which the sun can shine, is the best in which to place the scaly and very vibratory subject for the purpose of being photographed. The plate-glass side through which the exposure is made should be a specially-selected sheet of quite faultless plate-glass, free from even the slightest yellow tinge. Another matter of importance is the absolute clearness of the fresh supply of water with which the aquarium is filled for the occasion; while the need of perfect freedom of the "studio" aquarium from anything like mud or impurity should be sufficiently obvious. The lens is

SPURR'S

SODIUM

Is a combination of sodium salts prepared in dry form, 2½ times stronger than soda crystals . . . . .

In comparing the cost of

SPURR'S SODIUM

Remember it is two and a half times stronger than Crystals, and that one pound Sodium and one ounce Pyro will make four gallons of developer that cannot be equaled in quality by any other known formula. The leading operators of the day are using it and speak of its merits. If you want fine chemical effects, with detail in both high-lights and shadows, you cannot get it with impure and cheap chemicals. You will also be surprised to find your fingers are not all stained when using Sodium.

ST. JOSEPH, MO.

In reply to your inquiry, I would say the fact that I have used your chemicals for producing the negatives for our exhibit at Detroit meeting of the P. A. of A., is the best evidence that I am pleased with them. Yours truly, L. G. BIGELOW.

For Sale by all Photo Stock Dealers

PRICES:

1-lb. can, 35 cts.; ½-lb. can, 20 cts.

BURKE & JAMES

Sole Manufacturers of Spurr's Specialties

118 to 132 W. Jackson Boulevard, Chicago

Kindly mention THE PHOTO-MINIATURE

now accurately focused for a definite plane in the aquarium, and the shutter is set. Patient waiting and watching until the fish comes into the required position is now the only course."

◆

To those who would fain enlarge their photographic horizon, or renew their enthusiasm in photography, we commend the first two numbers of *Country Life in America* (Doubleday, Page & Co., New York).

We cannot recall an instance wherein photography has had so magnificent an opportunity to display its usefulness as was afforded by the publication of this remarkable magazine. The result more than fulfils our somewhat critical expectations. To look over its generously broad pages, and to see how our beloved photography adds to the pleasure and interest of life out-of-doors, is to receive a new inspiration and a larger revelation of cameristic possibilities.

◆

In answer to an oft-repeated demand for a plain and practical introduction to photo-micrography, Tennant & Ward, New York, announce the early publication of "The A. B. C. of Photo-Micrography." This little book, prepared by Mr. W. H. Walmsley, of Philadelphia, is intended as a guide for beginners in photo-micrography. At the same time it will cover its field in a comprehensive way and will be profusely illustrated. The need for such a manual has long been evident, and we believe that Mr. Walmsley's book will satisfy this need. We will be glad to have from our readers the addresses of friends interested in photography with the microscope. Lists of the members of microscopical societies will be especially welcome.

◆

The Playgoer is a new illustrated monthly published by Dawbarn & Ward, Limited, 6 Farringdon avenue, London, which will appeal to all interested in plays and players. The first issue indicates that photography is to be largely employed in its illustration, so that the

MILLEN'S
French Satin, Jr.

THE STANDARD blue print paper of the world, with its record of nearly fifteen years, has passed the need of special mention. Everyone knows it—everyone uses it—everyone has satisfaction and pleasure in using it. Always best, now better than ever, and we do not slacken our efforts to increase its excellence. It is made perfectly and packed perfectly in sealed tin tubes, and WHILE IN THESE TUBES will keep indefinitely. We were the first to devise and carry out this method of packing, and though imitators have since sprung up, they only imitate the package, not the contents. There can be no better blue print paper than FRENCH SATIN, JR. that is our first and last word.

J. C. MILLEN, M.D.
DENVER, COLORADO

magazine should also be interesting to the portraitist. Among other special features, we may note an article on "The Art of Ellen Terry," by Bram Stoker, with twenty illustrations from photographs; "The Theatres of Great Britain"; "Dress at the Theatre," etc. A clever reproduction of the Davenant Bust of Shakespeare, from a photograph by Mrs. Catharine Weed Barnes Ward, forms the frontispiece.

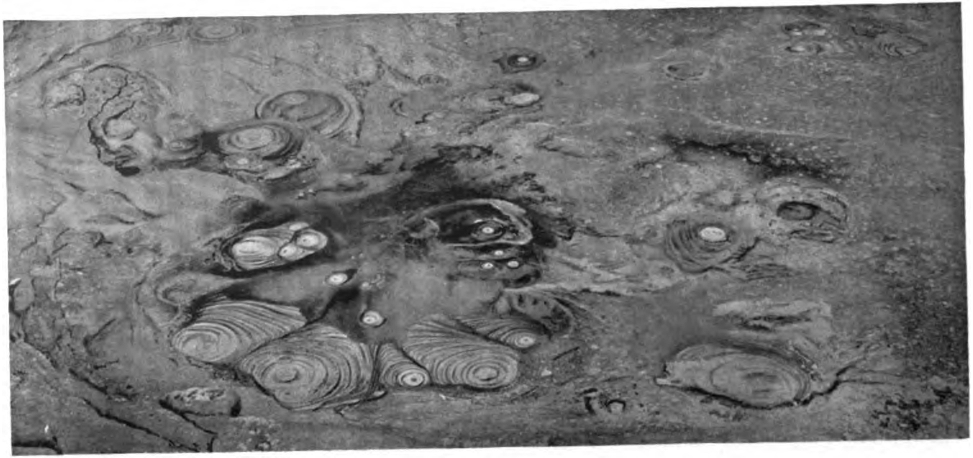
The Playgoer sells at sixpence per copy, and should rapidly win popularity if the interest of the first number is sustained.

◆

Messrs. A. W. Penrose & Company, Farringdon Road, London, send us a monograph on *Photo-Lithography with Ready-prepared Transfer Papers.* Full working instructions are given and the text is illustrated with diagrams. No price is given.

◆

The publication of "Photograms of the Year," 1901, has been delayed somewhat, but we are informed that the American edition will be ready for delivery about December 30.



PORRIDGE POTS—A VOLCANIC MUD FORMATION
Walter Burke, Christchurch, New Zealand

The Photo-Miniature
A Magazine of Photographic Information
EDITED BY JOHN A. TENNANT
Volume III NOVEMBER, 1901 Number 32

DEFECTS IN NEGATIVES

The most formidable and persistent difficulty encountered in photography is the reconciliation of theory and practice. Methods and processes which, in books, look completely reasonable, and seem to work out their purposes ever so smoothly, develop unaccountable and discouraging difficulties as quickly as we attempt their practical application. And of these difficulties the books rarely speak: an omission which adds exasperation to discouragement. Who has not experienced this bitterness? Wherefore, many workers in photography have lost faith in books and openly despise them. But this inevitably leads to leanness of information (otherwise, ignorance) and narrowness of view—twin evils more fearful than mental indigestion at its worst. The readers of THE PHOTO-MINIATURE, as I think of them, are of a wiser sort, eager to enlarge their photographic horizons, and philosophically inclined to read whatever is interesting, holding fast to that which proves trusty and helpful.

For the encouragement of these, and for the information of the curious, I propose to compass in this little book that field wherein photographic theory and practice first diverge, i. e., the making of the negative. And since other books make negative-making all too easy, neglecting the large possibilities of failure and disappointment, we will here confine ourselves to the faults and defects ordinarily found in negatives, with some account of their probable causes and remedies. The novelty of the point of view will, I hope, atone for the dolefulness of the tale. When all is said, it should prove to be one of the most interesting of those included in THE PHOTO-MINIATURE series. To consider all the possible defects in negatives is, of course, impracticable. The subject is too big. But we can fairly cover those which most frequently trouble amateur and professional photographers. Hence, although lacking in completeness, the book will offer practical help as far as it goes, and so fulfil its purpose. For the larger part of what follows I am indebted to François Voitier, a young photographer with considerable experience in negative-making. Where possible, I have added information from other reliable sources, so that the reader has herein a practical digest of the information available concerning the subject.

Experience tells us, beginners and experts alike, that negative-making is a series of compromises rather than an exact science. Not long ago, in speaking with a photographer notable for his technical skill, who is also a large employer of photographic labor, the negative came under discussion. According to his experience, among ten capable photographers offering their services as negative-makers, not more than one could intelligently diagnose the faults and failings evident in a batch of everyday negatives submitted for examination. This is a serious defect when we remember that the negative is but the first step—a means to an end—and that end the positive or print. The more we know about our negatives, their faults as well as their virtues, so much the more intelligently can we set about obtaining what we desire in our prints. This is better appreciated now than it was five years ago. The accidental success of the man who knows nothing and cares nothing about technique still haunts us; but the serious worker realized long ago that the real masters in photography are, first of all, masters of technique, and afterwards of their hearts' desires. The plain purpose of this number of THE PHOTO-MINIATURE is to so fully inform the reader concerning defects in negatives that he will be able to recognize the causes from which they may proceed. This being understood, the prevention or remedying of faults in his own negatives will be rendered comparatively easy and certain.

The Root of All Evil Broadly speaking, all the defects observable in our negatives may be traced to the inconstancy of almost every factor influencing their production. The sensitive dry plate or film is subject to innumerable variations: in the quality or condition of the materials of which it is made, in its manufacture, in its storage and handling before and after exposure, in development, and even in the simple operation of "fixing" or clearing the image. Variations of temperature, action of light, choice of a developing agent, the composition of the developing solution, the washing and drying of the film—all these, and a thousand other variants, provide causes for troublesome or fatal defects in negatives. Add to these the ever changing personal factor, the fatal cheapness of plates and material, the lack of knowledge or serious purpose in the majority of workers, and the comparative rarity of a technically good or unblemished negative can no longer excite surprise. This is abundantly supported by experience. Quite recently, in scrutinizing over a thousand prints sent in for competition, where substantial awards were offered, I found less than fifty prints exhibiting proof that their makers had an intelligent grasp of negative-making.

The Perfect Negative Page after page might be written in the attempt to define what is meant by a perfect negative, but the discussion would not be profitable to our present purpose. For my own part I call that a perfect negative which, with proper care in the choice of printing paper and in printing, will give me in the finished print the effect I desire in my representation of the thing photographed. In considering the negative as required in commercial photography, however, it is generally agreed that the perfect negative is one in which all the gradations of light and shade—the varying luminosities of contrast and color—seen in the subject are proportionately represented by corresponding gradations of density or opacity. This definition will be clearer after a second reading. Such a negative will yield a print showing the subject as the eye saw it, a perfect replica of the appearances of the subject, reduced in scale according to the size of the picture image, and lacking the third dimension, solidity.

The defects and shortcomings discussed herein apply to all negatives regardless of the standard of perfection aimed at by the worker. Briefly grouped they are: fog, veiling, pinholes, air-bubbles, insensitive spots, streaks or patches of uneven density, abnormal markings of all sorts, "pits," stains, scratches, frilling or puckering of the film, and similar faults impairing the usefulness of the negative for practical purposes.

Chemical Fog

Let us begin with the various "fogs" which beset the beginner's negatives so persistently. Chemical fog is a veil or haze which covers the picture image, imparting to it a dull flat appearance. The word is self-explanatory, the condition of the negative resembling the hazy appearance of the atmosphere on a foggy day. The veiling of the image is not always equally dense, sometimes so slight as to merely flatten the picture and rob it of brilliancy; at other times sufficiently dense to completely envelop or bury the image, so that its details are seen with difficulty. As a matter of fact, three-fourths of the amateur's negatives are more or less fogged, although the extent of the evil is not generally appreciated. As the printing quality of the negative is thereby greatly injured, clearness and brilliancy in the print being rendered practically impossible of attainment, pains should be taken to avoid this defect which may have several causes.

Temperature

Cause (*a*): The use of too warm a developing solution.

Remedy: Keep the darkroom at a uniform temperature all the year round, say at 65° Fahr. This, of course, will bring the solutions to the same temperature. It is folly to attempt by artificial or local means (ice, etc.) to reduce the temperature of the solutions while using them, unless the temperature of the room is reduced also by means of proper ventilation, or the use of an electric or water-power fan. The use of ice may decrease the temperature of the solutions 10 degrees, but this condition will only continue for a short time, often for a few seconds only, because the temperature of the room influences the solutions, and not vice versa. Thus the one cannot for long register 10° more or less than the other. This question of temperature is of supreme importance in negative-making, and is responsible for many defects charged to other causes.

Alkali in Excess

Cause (*b*): The use of an excessive proportion of alkali in the developer.

Remedy: Only sufficient alkali should be incorporated in the developer to bring its speed or effectiveness to a desirable and controllable point. The chief function of the alkali used in development* is to energize the reducer or density-giving agent. The proper balance between the two must be ascertained and carefully maintained. Too small an amount of alkali not only means unduly prolonged development, but also tends to increase the contrasts in the negative, while too large an amount of alkali has the opposite effect, i.e., flattens the image and veils it in fog. The proper proportion of alkali for the most advantageous development of a plate can only be determined by experience, varying according to the brand and speed of the plate used, the season of the year, and the probable duration of the development.

In using a plate with which we are more or less familiar, the make-up or character of the plate (emulsion) is presumed to be constant or uniform. But the composition of the developer must be varied according to the season, exposure, character of the subject, etc. Thus common sense dictates a slightly smaller proportion of alkali in hot weather than in cold weather, unless the temperature of the dark-room and solutions can be absolutely controlled. More important is the readjustment of the proportion of alkali when the brand of plates is changed. The quantity of alkali needed for a "slow" plate may "kill" a more rapid plate, rendering it apparently slow and fogged. In the same way the use of alkali in excess when development must be prolonged will cause chemical fog with almost any plate. This is apparent in the "graying" or darkening of the white, unexposed strip of emulsion at the two ends of

---

*See pages 533 *et seq.*, THE PHOTO-MINIATURE No. 11: *Developers and Development.*

the plate protected during exposure by the grooves of the plate-holder or "dark slide."

Caustic Alkalies

Cause (*c*): The use of too energetic an alkali, such as liquid ammonia .880, caustic potash or caustic soda.

Remedy: Discontinue the use of caustic alkalies except where absolutely necessary (or where definitely advised for a certain developing agent or brand of plates). One of the peculiarities of the caustic alkalies is their tendency to cause fog, even when used in comparatively smaller quantities than the carbonate alkalies. It should be noted, however, that many photographers, as in Great Britain, prefer a caustic alkali (liq. ammon. .880) because it gives a desirable printing quality to the negative, and a slight veil over the shadows, which is said to give depth and richness to the "tone" of the print. Ammonia here, of course, is used almost exclusively with pyro. The use of caustic alkalies is especially productive of fog with old or "stale" plates.

In Development

Cause (*d*): Unduly prolonged development to compensate for underexposure, or to secure greater density.

Remedy: Expose correctly and so obviate any necessity for keeping the plate so long subjected to the action of the developer. No addition of alkali will bring out details in a much underexposed plate, and density can be secured by increasing the proportion of reducer or density-giving agènt.

Cause (*e*): The use of overmuch developing solution.

Remedy: The proper amount of solution for the development of a plate smaller than 3¼ x 4¼ is 1 ounce; for plates up to 5 x 7, use 2 ounces; for plates up to 8 x 10, use 4 ounces. It is well known among professional workers that the use of a small quantity of developing solution, with care and skill to keep the plate always covered by the solution, results in a more vigorous negative than is obtained when the developer is used in larger quantities. Too small an amount of solution will cause (in unskilled hands) streaks and patches of uneven density, air-bells, and the like. Too much solution is liable to cause a general reduction of silver in the sensitive film, i. e., fog. Where this defect is accompanied by abundant density of image, the use of an acid alum-iron clearing solution will improve the negative: Alum, 1 ounce; ferrous sulphate, 3 ounces; sulphuric acid, 30 to 60 minims; water, 20 ounces.

Dichroic Fog

Sometimes a fogged negative, when looked through, appears of a pink or reddish color; when viewed by reflected light it seems to be of a greenish or yellow color. This is dichroic or two color fog, now rarely met with.

Causes: Very old or stale plates; the use of a developer not suited to the plate, as a "ready-prepared" developer of unknown composition; the use of pyro and ammonia in excess with overexposed plates; and prolonged exposure with double-coated plates.

Remedy: The defect is peculiarly difficult to remove, but after washing and fixing the plate try immersing it in: thiocarbamide, 5 grains; citric acid, 5 grains; water, 1 ounce. Another formula is as follows: Take four ounces of a 2 per cent solution of potassium bromide, and add to it half an ounce of saturated solution of copper sulphate (blue vitriol). Immerse the negative in this for a few seconds until just clouded over on the surface, then take it out, wash it at once, and put it in clean hypo. If the fog is on the surface, it may be possible to get rid of it in this way without reducing the image too much, but there is always a danger of reducing the image also right away, which must be guarded against.

The accidental introduction of hypo-soda or nitrate of silver into the developing solution will also produce chemical fog; as will the decomposition or deterioration of the sensitive film by proximity to injurious substances, fumes, etc. The only remedy is to remove the cause, and try a clearing bath for plates already fogged. As we will see throughout these pages, the best cure for most defects in negatives is to remove the cause.

Iridescence: Metallic Luster

Another form of chemical fog is evidenced by iridescent edges or a metallic luster on the surface of the negative after fixing.

Causes: This iridescence is most commonly met with in using stale plates, or it may result from an emulsion carrying an excess of silver nitrate and, therefore, peculiarly susceptible to impure vapors and atmospheric conditions. An overcooked emulsion will also give this metallic luster. Underexposure and forced development combined offer another cause.

Remedies: It has been ascertained that this iridescence rarely, if ever, occurs when ferrous oxalate is employed as the developer. This indicates a remedy for plates known to possess the defect, as well as for the improvement of negatives stained in this way. To effect the latter, immerse the stained plate, after fixing and washing in ferric chloride 50 grains, potassium bromide 30 grains, water 4 ounces. The fog will disappear within a few minutes, but the density of the negative will be reduced. Rinse the plate and apply a standard ferrous oxalate developer to restore the desired density, after which refix and wash the negative.

Where the iridescence is not severe, gentle rubbing of the film when dry with a wad of absorbent cotton or chamois leather well moistened with alcohol will usually reduce or remove it. As fast as the cotton or chamois becomes discolored it should be renewed, and care should be taken to keep it always moist. Sulphuric ether, used in place of alcohol, is said by some workers to be more effective.

Light-Fog

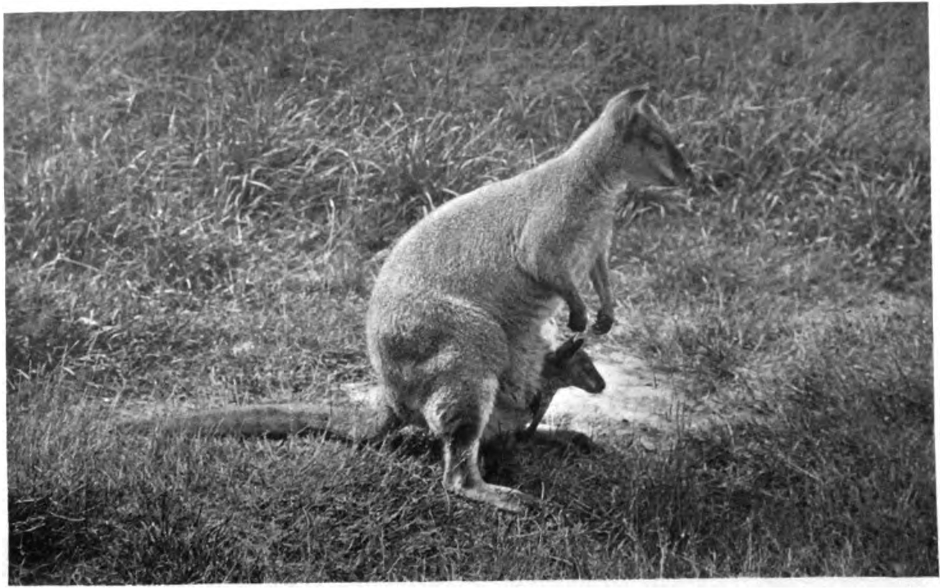
The extreme sensitiveness of dry plates or films to the action of light is not as keenly appreciated as might be, consequently many negatives come from the "fixing bath" more or less veiled or fogged by carelessness in handling and manipulation. Light-fog is a general term applied to all the varieties and forms of fog produced in plates by light action other than the exposure proper. Sometimes it is general, i. e., spread uniformly over the plate; at other times it is local and confined to part of the plate, and has a definite shape.

In the Dark-Room

Cause (a): Exposure of the plate to an unsafe light in filling the holders or during development.

Remedy: Test your dark-room light frequently by exposing a plate for ten minutes at the distance from the light where the changing or developing of plates is

MT. EARNSLAW, LAKE WAKATIPU, NEW ZEALAND
Walter Burke



KANGAROO, WITH YOUNG IN POUCH
Walter Burke

done. If, after this exposure, a plate of ordinary rapidity gives fog or the slightest indication of density upon development the dark-room light should be regarded as unsafe. The question of dark-room illumination will be fully dealt with in the following number of The Photo-Miniature: *The Dark-Room*, so that its discussion here would be out of place.

Cause (b): Undue exposure to a presumably safe light.

Remedy: A dark-room light which is safe for one plate is not necessarily safe for another. This applies particularly to ordinary as compared with color-sensitive plates. A light safe for normal conditions may fog a plate exposed to its action for an abnormal length of time. A light which is safe in winter or when a quiet dull illumination is the normal condition, may not be safe in summer, or when sunlight is the source of illumination. All these possible causes apply to the frequent examination of plates during development (a pernicious habit in any event). Plates should not be exposed to *any* light longer than is absolutely necessary until completely fixed and cleared. If we could develop and fix our plates in complete darkness, our negatives would, generally speaking, show great improvement in crispness and brilliancy. If these facts are kept in mind, and care taken to ensure a perfectly safe light for the manipulation of plates at all times, the reader will at once observe the advantage, especially in negatives made on color-differentiating plates, which should be handled only with the "safe lights" advised by their makers. This information is now readily given by the manufacturers of plates which are sensitive to those parts of the spectrum to which ordinary plates are only feebly sensitive.

Cause (c): Light entering dark-room during development.

Remedy: Next to the importance of having a safe working light, comes preventing the entrance of actinic light through the window, keyhole, cracks of the door, transom, etc., of the room used for changing or developing plates.

An excellent dark-room window curtain is made in two sections, each a little larger than one-half the size of the window, and of triple thickness,—ruby cheesecloth, heavy wrapping-paper and ordinary black twill focusing-cloth. The paper should be in the center, with the cheesecloth facing the window and the black twill cloth on the inside towards the room. Tack the two sections at the top and sides of the window, letting them hang loose at the bottom. The object of making the curtain in two sections is that each may be fastened back when the room (presumed to be a bath-room) is not in use for photographic purposes. To convert the room into a dark-room, pin the two sections together at the center. Instead of tacking the curtain at the top and sides, it can be fastened at the sides only and arranged to pull back on two pieces of tightly-drawn wire, held in place by stout nails at the sides of the window. This curtain will effectually exclude all light from the window. By suspending a heavy blanket or opaque curtain from the top of the door (or transom, if there be one), no white light can enter through the keyhole or cracks. But this will be more fully dealt with in our next number.

Should it be necessary to leave the dark-room during development,—that is, with unfinished plates in the developing solution,—cover the trays carefully before opening the door. Developing rooms, in the home or studio, should invariably be locked or fastened from the inside during development.

Cause (*d*): Permitting "white" light or daylight to reach the plate before fixation is completed, i. e., before all the unaffected bromide of silver in the film has been perfectly removed by the action of the fixing bath.

Remedy: Remember that the bromide of silver in the film unaffected during exposure and development is light-sensitive. Fix your plates in the dark-room, and preferably under cover, shielding them from all white light until completely fixed and cleared. This simply requires the exercise of care and patience.

In the Field or Studio.

Cause (*a*): The rapid withdrawal or replacing of vulcanite or hard rubber slides used in many plate-holders. This has been known to set up an amount of electrical action sufficient to fog the sensitive film.

Remedy: Handle the slides carefully when withdrawing or replacing, or equip your holders with slides made of other material, such as pressed pulp or wood.

Cause (*b*): Defective bellows or lens mount. Light admitted to the plate while in the camera other than that coming through the lens, i. e., by reflections, etc.

Remedy: Test the shutter and camera-box as follows: Fix the camera on the tripod, close the shutter and remove the ground-glass. Now, with the focusing-cloth thrown over the head and the camera pointed at the sun or an electric arc light, watch closely for a few minutes. Do not be in too great a hurry, as the sudden change from bright light will temporarily "blind" you. When the eyes have become accustomed to the darkness the sense of sight will regain its normal keenness, and thin pencils of light will be seen coming through the corners of the bellows or lens-board, or leaking through the shutter, if the trouble lies at any of these points. After carefully noting and marking the defective spots, make the bellows or lens-board light-tight by glueing pieces of black or dark red leather over the holes, but it will be advisable to detach the shutter and take it to an expert for the necessary adjustment. The wearing at the corners of the bellows is caused by the constant racking in and out of the camera, occurring frequently in inexpensive outfits equipped with "imitation leather" bellows. After having fixed all the holes in the bellows as suggested, and with the shutter adjusted, make a second test, similar in all respects to the first, to make sure that no leak, however trivial, has escaped attention. Broadly speaking, a pin-hole is as bad as a small-sized lens aperture, as sufficient white light can pass through the former to ruin any plate.

Cause (*c*): Defective plate-holders or "slides."

Remedy: Plate-holders, or "dark slides" as they are called in Great Britain, need frequent and careful examination. The continual wear and tear to which they are subject provides a fruitful cause for light-fog. Sometimes the corners of the slide proper will wear down or chip by constant use, and the aperture thus made, even when the slide is pushed right home, allows light to enter and strike the plate. Then a fall or sudden jar may have loosened the dovetailed joints; or, again, the slide may not fit the holder properly. If the corners of the slide have worn off, or if it is generally ill-fitting, take the holder to your dealer and get him to supply you with new slides. If the dovetailing of the holder has loosened, a little glue will fix the matter. It is also well to see that the partition in the middle of the holder is perfect, free from holes or cracks; otherwise, the light which has passed through the lens to expose the plate on one side is liable to penetrate the defective partition and fog the plate in the other section.

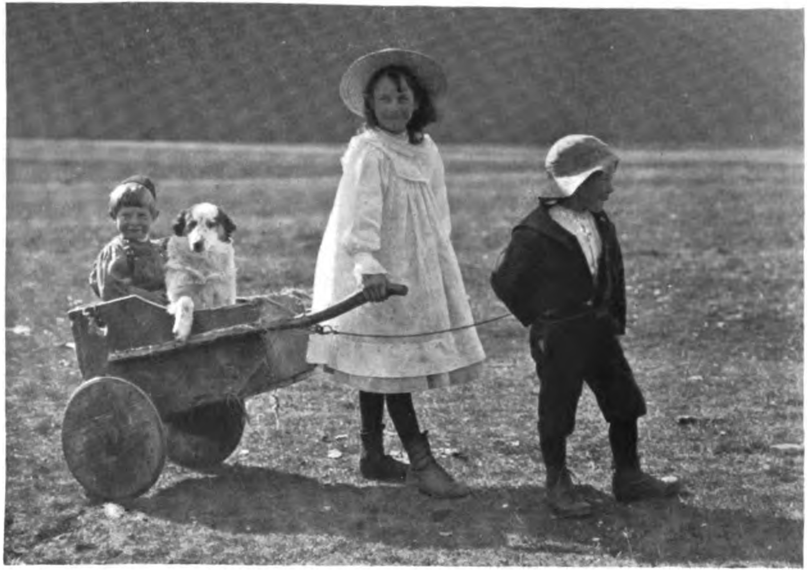
Cause (d): Failure to push slides fairly home after filling holders or after exposure.

Remedy: Be sure to push the slide into the holder as far as it will go. When the former has seen considerable service, especially if it was flimsy in the first place, it may have a tendency to "buckle" at the bottom, caused by a separation of the several thicknesses of material of which it is made. In this condition, the slide rides the edge of the holder instead of running in the groove made for the purpose. If the protecting catch cannot be turned over the top of the slides, it is certain that they have not reached their destination. A new slide is the best remedy for the trouble.

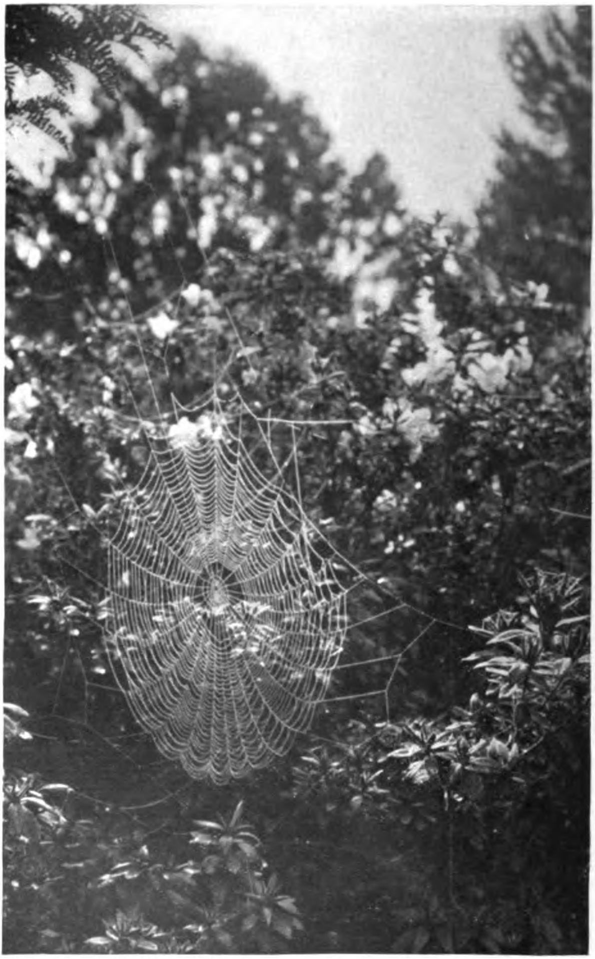
After making an exposure, it is well to replace the slide under cover of the focusing cloth, which can be thrown over the camera and hand during this operation. Do not attempt to remove the holder from the camera until the catch has been turned over the top of the slide, and immediately store the holder in a stout canvas bag.

Cause (e): Failure to insert the slide properly in replacing it in the holder. This applies more particularly to American plate holders provided with a protecting flap or light trap, which is pushed aside as the slide is first entered in its groove.

Remedy: It would seem a very simple matter to insert the slide in the holder, and so it is; but there is a right and a wrong way of doing it, as in everything else. The wrong way is to insert one corner of the slide quite a distance in the holder before bringing it to an upright position, and then pushing it in all the way across. The right way is to insert one end of the slide only *just far*



A TANDEM TEAM
Walter Burke



A SPIDER'S WEB
Frank J. Denton, Wanganui, New Zealand

enough to catch and serve as a guide (say an eighth of an inch at the most), then bringing the slide to an upright position and pushing it in evenly. There is a protecting flap just inside the top edge of the holder, and by pushing the corner of the slide in too far, or by twisting the slide ever so little, this valve by being forced open, allows the light to reach the plate before the aperture is covered by the balance of the slide.

Cause (f): Allowing sunlight or strong white light to fall on loaded plate-holders.

Remedy: To the careless worker this precaution might seem unnecessary, but the careful one considers any safeguard calculated to minimize the chances of light-struck plates worthy of consideration. No matter how flawless plate-holders may be, it is a poor if not dangerous practice to allow strong direct light to fall on them for any length of time; it is unnecessary to run the risk, however trivial it might be. In working out-of-doors keep all plateholders in stout bags of black twill cloth or felt made expressly for the purpose. The holder should pass directly from the bag to the camera when ready to make an exposure, and afterwards have the bag ready to receive the holder as it leaves the camera.

After-treatment: The chances of improving a completely light-struck plate by any method of after treatment are so slim that the time spent in the attempt would better be devoted to something where the results are more certain. Almost all the methods suggested begin with a general reduction of the negative to clear the veil or fog, followed by re-development or intensification to restore lost density. The risks involved in the experiment are apparent.

Pinholes

The small transparent spots in negatives, commonly known as pinholes, are a source of great annoyance in photography. Careful workers are rarely troubled with them, but they abound in negatives made by inexperienced amateurs and careless professionals. This gives us a clue to their usual cause. They generally occur in great numbers, clustered together like the stars in the Milky Way, barely visible to the naked eye, but plainly apparent as black specks in the print.

Causes: Dust in course of manufacture. These are true pinholes and consist of perforations right through the film or emulsion, *i. e.* specks of clear glass. The careful examination of an unexposed plate from a batch so afflicted will reveal them as plainly as in a finished negative. Such a batch of plates should be returned to the maker. Sometimes these true pinholes are due to minute ruptures in the emulsion, possibly caused by the liberation of gas during the cooking of the emulsion, or during the development of the plate. Bubbles in the emulsion also cause pinholes, but these may be detected by their peculiar appearance. They are round and surrounded by a wave or ripple in the film, whereas ordinary dust-speck pinholes are irregular and ragged in outline.

The almost invariable cause of pinholes, however, is dust specks permitted to settle upon the film in the holders, during exposure, or in development. These are *so-called* pinholes, being simply transparent spots of gelatine where the light was prevented from acting on the film, or the developer could not perform its work because of particles of dust.

Remedies: See that the interior of the camera is kept absolutely free from dust by frequent careful cleansing. This is especially necessary if the camera is laid aside unused for any length of time, as during the winter months. In opening the back to insert the holder also, dust is liable to enter the camera and cause trouble.

Plate holders, or dark slides, need careful and frequent cleansing, the wear and tear to which they are subjected causing them to harbor dust and particles of all sorts. Always dust them thoroughly before filling with plates.

Plates, before being put into the holders, and just before development, should be carefully dusted. Usually this is done with a broad camel's-hair brush kept solely for that purpose. But this, in itself, is often a source of dust on the slightly tacky film in damp weather. A better duster is a piece of soft velvet, fitted to form a straight edge or kind of squeegee. If this is kept perfectly clean, and drawn quietly over the film before development, or before inserting the plate in the holder, dust specks will rarely give trouble.

For a valuable negative burdened with a crop of pinholes there is no remedy except patient and careful "spotting" of the holes, using a hand magnifier to make the work as easy as possible.

Spots: Air Bubbles

There are so many different kinds of spots that it would seem necessary to treat each variety separately.

If they are small, round and transparent, with edges clearly defined, they are due to the formation of air bubbles on the developing solution. Whether the method is to pour developer from a graduate on to the plate (which, by the bye, is the proper way) or to immerse the plate in a tray already containing the solution, it matters not. In either case see that the developer completely covers the entire surface of the film at one sweep. A little practice will enable the beginner to do this; it is not so difficult as it may at first appear. As soon as the plate is immersed, gently go over the surface with a small tuft of absorbent cotton; this will break up any air bubbles which may have formed. Prepare all working solutions with well or distilled water, or boiled water allowed to cool before use. River and cistern water favor the formation of bubbles on account of the excess of organic matter which they usually contain.

Angular Spots

Small angular-shaped spots, transparent and of irregular size, are caused by dust and dirt, picked up by the plate either from the inside of plate-holders or camera, or from unclean solutions, or by small crystals, due to incomplete dissolution when preparing solutions, coming in contact with the film. By making a point to dust the plate-holders, both inside and out, before loading the plate, and filtering the developer before letting it touch the plate, spots of this description will disappear as if by magic. Then again, slides should always be removed and replaced *slowly* and thus avoid setting in motion particles of dust in the camera which might ultimately settle on the plate. The developer cannot act on those portions of the film covered with dust and dirt; hence the spots. Crystals ought to be completely dissolved before using solutions. If, perchance, a few remain undissolved at the bottom of the bottle, a little care in pouring will prevent their dropping into the tray. Bottles and trays must be kept scrupulously clean. Perfect work can never be expected from dirty solutions. Ammonia and caustic soda, followed by plenty of water, are excellent for removing grease from these trays; they can then be freed from the alkali by washing in water to which has been added a few drops of hydrochloric acid.

Larger Spots

Fairly large triangular-shaped spots of irregular size are due to a scum which will form on the surface of the developing solution if it is allowed to stand in an open vessel, a tray or a graduate for any length of time before it is needed for use. When the receptacle is moved the scum breaks up into triangular particles, which prevent the action of the developer wherever they adhere to the film. By either filtering the solution or not pouring it out until just before use, or both, the trouble will be completely obviated.

Opaque Spots

Irregular-shaped and sized purple or dark opaque spots only occur when pyrogallic acid *in dry form* is added to the other ingredients of the developer just before use. The spots come from the adherence of particles of the dry chemical to the plate. They can be removed by immersing the plate for a few minutes in water to which has been added a little nitric acid. This acid should be used sparingly, merely enough to remove the spots within a short time.

Blotchy or Patchy Spots

These are due to neglect to rock the tray during development, especially when pyro is the reducing agent. The tray should be rocked during the entire time the plate is in the solution, in order that the action of the developer may be uniform. The rocking need neither be violent nor too frequent, but a gentle movement of the tray every twenty or thirty seconds to keep the solution from "settling." Should one have other matters that require attention when plates are in the developer, it might be a good plan to avail of one of the many automatic tray-rockers on the market, or a perusal of the magazines and annuals will disclose a number of schemes whereby such a device can be constructed at home and at small cost. I have a friend who fondly imagines that his plates are not progressing favorably and that he is neglecting his duty unless the solution is rushed across them about twice a second and with great force. The result is that the plate strikes first one end of the tray, then the other, chipping off small sections of glass en route by the contact (which eventually find their way to the film and lay the nucleus for a good crop of disfiguring holes and scratches); and as for the solution, why, he wonders what makes it disappear. A ready explanation is found upon turning up the gas, however; the wet floor and bench tell the story. One can go to extremes in either direction—too little or too much rocking. Compromise on a happy medium and all will be well—i. e., as far as this phase of the question is concerned.

The best after-treatment for a negative marred with blotchy spots is to clean off the film entirely, put a good print behind the resultant piece of glass, bind it with passe-partout and hang it in the parlor. If the negative is considered to be a valuable one (the carelessness in developing it hardly supports such a theory), reduce the fully-developed portions locally to a point which will bring them as nearly as possible to the density of the balance, then intensify the whole negative. In any event, success is not positively assured.

Mottled Appearance

Sometimes a negative will present a curiously mottled appearance on drying. Ribbed marks, usually curved, resembling a flat seabeach when the tide has gone back, cover the whole or part of the negative image. This may proceed from several causes, which, in themselves, suggest reasonable remedies.

Imperfect fixation or a stale plain hypo bath is a frequent cause. Let the hypo bath be renewed frequently, and see that all negatives remain in the bath fully ten minutes after they appear to be perfectly cleared.

A lack of continuous rocking of the tray during development will also produce this defect. The remedy has already been mentioned in the preceding paragraph.

The retardation of the drying process after washing is another cause. Let the drying process be completed at approximately an equal temperature. Do not let the negative start to dry in a heated room where the temperature is liable to drop considerably during the night. The window sill is a good place for negative drying, provided that there is no danger of dust. In intensely cold weather, however, this may freeze the film, and so cause the mottled appearance by unduly delaying the drying process. Negatives are best dried in a light current of air, free from dust, changes of temperature or moisture. The quicker a negative can be dried without resort to artificial means, the better. If a quick proof is desired, soak the negative in alcohol for five minutes, roughly drain off the surface moisture, and stand it in a current of dry air, where it will dry completely in from five to ten minutes.

Leathery Film

It will sometimes happen that a plate will refuse to dry evenly as far as the surface is concerned. It becomes leathery in appearance, dirty and streaky. This is usually caused by insufficient rinsing between development and fixing, or insufficient washing after fixing, precipitation of alum from an alum-hypo fixing bath if the bath is warm or old. Here the cause indicates the remedy.

Negatives should not be washed for less than an hour in running water, nor for more than an hour. Excessive washing is to be avoided for two reasons,—first, it may cause partial dissolution of the gelatine, in which event uneven drying would follow; second, it may rob a negative of some of its brilliancy. Still, the hypo *must be eliminated.*

One of the peculiar characteristics of alum is that a white precipitate of aluminum oxide is thrown down when the salts are in very dilute solutions. This aluminum oxide is an insoluble compound and shows on the film in the form of a white deposit. The effect is greatly accentuated when hypo and alum come in contact. The subject is intensely interesting and I regret that a more comprehensive consideration of it is a little out of place here. Alum is exceedingly useful to the photographer,—ofttimes indispensable; but it should be used with a full knowledge of the chemical effects produced; without such an understanding, it can accomplish far more harm than good.

Fungoid Growth When plates have been stored for a considerable time in a damp place, as may happen in a rainy season or tropical locality, the gelatine film is liable to give evidences of incipient decomposition. A negative made upon such a plate will, after development, show a weed or root-like formation, or insensitive patches of soft irregular outlines. These are fungoid growths and are usually accompanied by dark edges in the negative. Plates showing these defects are, of course, useless. Remove the cause by care in storing plates where dry air has continual access to every part of their enclosures.

Comet-shaped Pits These curious markings result from overmuch washing of the negative while the gelatine film is tender or softened by a developer rich in alkali. Too strong a stream of water, or water falling in a concentrated stream from a little distance, will also produce this defect. It is often accompanied by an amount of veiling or fog, the pits themselves being directly caused by solid particles in the water. Diffusion of the hypo, rather than forceful washing, is the remedy.

Parallel Lines These parallel lines are generally equidistant from each other, extending across the plate.

Cause: Fixing plates in a grooved fixing box with a too strong solution and without stirring before use.

Remedy: There is no necessity for using a fixing bath of too great strength. The extra strength may apparently fix the plates in a shorter time, but at some risk of injury to the image. Be content with a normal strength solution, but let it be fresh and not burdened with the developer that has been carried by a dozen negatives from the developing tray. If a plain hypo bath is favored, consider that it has done full service after it has fixed say three plates; if your choice is one of the acid variety, do not expect it to do its work expeditiously and well forever, even though the dealer assures you that it will fix twelve dozen negatives and still retain a spark of life sufficiently bright to tackle a dozen or two more at a pinch. Before filling the fixing box with the solution, stir the mixture thoroughly to rid it of all sluggishness and give it uniform strength. When these two precautions are taken, i. e., a normal solution, well stirred, the parallel lines will disappear.

After-treatment: Try thorough washing by hand, i. e., carefully holding the negative under a faucet giving a fairly powerful stream of water. Keep the plate moving and let the water strike it at an angle. In this way, some of its force will be broken and injury to the film avoided. Of course, the plate should be washed for an hour in running water in the usual way.

Fine Transparent Lines

Cause: The use of too coarse a brush in dusting plates.

Remedy: A pad of velvet or plush is better than a brush for cleaning plates, but in case a brush is preferred, it should be one of fine camel's hair. Here is the whole thing in a nutshell, whether you use velvet or brush: go over the surface of the film slowly and gently and in one direction only.

After-treatment: The effect of the lines may be minimized by printing through fine tissue paper, but it is doubtful if the defect itself can be removed.

Frosty, Crystallized Appearance

Cause: Imperfect fixation and washing, either by fixing in too small a quantity of hypo or overworking the bath.

Remedy: Let me ask a question: Why is it necessary to fix a plate after development? And let me answer it. A photographic emulsion is a gelatinous substance in which a sensitive silver salt is held in suspension. During the period of exposure, the light passes through the lens and acts on just so many of these particles of silver bromide as is necessary to impress the image on the film. The subsequent process of development reduces to metallic silver these particles of silver upon which the light has previously acted,—but how about the balance, those unaffected either by the light or development? This is what constitutes the province of the fixing bath, and if it is either deficient in quantity, overworked or not given time to effect complete dissolution of the unaffected bromide of silver, *which is still sensitive to light*, decomposition sets in, and this is what gives the negative film that frosty appearance of which we are speaking. If the theory of fixing was better understood, this part of the making of a negative would not be so frequently slighted. Hence, this somewhat detailed explanation of the process.

It might be in order to here mention one of the evils resulting from the use of an ordinary tray for fixing plates in still water. Hypo, being heavier than water, settles at the bottom of the tray. When following the instructions "twelve changes of water at intervals of five minutes," many workers fail to completely empty the tray at each change, with the result that some of the hypo is left at the bottom which, with the next change of water, is stirred up and again finds a resting place on and in the film. This operation is repeated during the entire washing process, a portion of the hypo from the previous change of water being thus retained in the tray for the benefit (?) of the "fresh" water, and the negative may finally carry away with it a little hypo. Even the pretence of giving it a final swish under the faucet fails to entirely eliminate it.

Non-halation and all double-coated plates require more time in fixing and washing than ordinary plates.

After-treatment: Thorough soaking and prolonged washing will help to restore the negative, but no after-treatment will put it in as good condition as if it had been properly fixed in the first place.

Another method of remedying the defect is to gently rub the crystallized portion with a piece of dry cotton wool, when the hypo will come off in the form of a fine powder. The film should be thoroughly dried or but little of the hypo can be rubbed off.

Frilling

Frilling is a separation of the film from the glass support, occurring at the edges of the plate, irregular in shape and extending for varying distances from the edges. Some makes of plates frill more easily than others, and plates frill more easily in summer than in winter, but the root of the trouble is usually found in faulty manipulation. When frilling occurs the film is easily torn or frayed and the edges will present a series of overlappings when the plate dries, so that a portion of the plate will be lost as far as printing is concerned.

Causes: Apart from fault in the plates or climatic causes, frilling may result from the use of too large a proportion of alkali in development; or too high a temperature in development (see paragraphs on these items); extreme changes of temperature resulting from immersing the negative in a cold hypo bath from a warm developing solution; the use of a freshly-made hypo bath in hot weather; a hypo fixing-bath of too great strength; and overmuch developing or washing. In other words, whatever tends to soften or rot the film may help to loosen its hold upon its support, permitting the various solutions to creep in between the film and its support, thus causing blisters, frilling or puckering.

Handling the plate frequently with warm fingers is another fruitful cause of frilling. Rough handling, or too energetic treatment during washing, especially in warm weather or with plates predisposed to frill, should be avoided.

Remedies: The best remedy for frilling is to prevent it whenever there is reasonable cause to fear it. Thus, take an ordinary candle and run it around the film side of the plate a distance of an eighth of an inch from the four edges. The resultant rim of grease prevents absorption of water by the edges of the film, and so makes it improbable that it will leave its support. A solution of india-rubber varnish or even negative varnish can replace the candle if desired, these latter being applied with a small brush.

If a plate begins to frill while in the developer, remove it, carefully wash it and immerse for five minutes in chrome alum ½ ounce, water 20 ounces. This will harden the film. Now thoroughly wash the negative and resume development. For the prevention of frilling after development an acid-alum fixing bath is advised, more especially during hot weather. In winter a plain alum-hypo bath will be sufficient.

To correct frilling which has not proceeded too far, remove the plate after fixing and washing to a clean tray and cover it with wood alcohol. Rock the tray for a few minutes, drain the plate and gently press back into place the loosened edges of film, using the tip of the finger for this delicate operation. If the film has not contracted sufficiently, immerse the plate again in a stronger solution of alcohol, and afterwards proceed as before. If the film has contracted overmuch immerse the plate in wood alcohol diluted with a little water, rocking the tray for a few minutes, and then finishing as already outlined. All this is nice practice and needs skilful care, but with these a frilled negative can often be completely restored to its normal condition.

Blisters

Practically the only difference between blistering and frilling is the difference in the location of the defect. The term frilling is applied more particularly when the separation occurs at the *edges* of the plate, while blistering takes place on the film at a distance from the edges. A blistered film when dry has a pock-marked appearance.

Cause: The same as frilling, but due especially to using too warm water for washing or allowing the water to run on the film with force, also by holding negative with thumb and fingers pressing against the film instead of grasping it by the edges.

Remedy: (See frilling.) Do not allow water to run directly on the film at any time, except, perhaps, when giving the plate a final wash while held in the hand, in which case it should be kept moving quite rapidly from side to side. This will break the force of the water (which should not be too great in any event) and save the film from injury. It is preferable to use a washing-box, especially those that carry the water to the bottom. This forces out the hypo, which, being heavier than water, will naturally be inclined to settle on the bottom.

No matter when handling a negative, wet or dry, grasp it by the finger and thumb, pressing only on opposite edges. This is safe and admits of handling freely and as often as desired.

After-treatment: None. If there are only two or three small blisters, the treatment outlined for spots and pinholes might be tried, but it is much better to make a new negative and avoid the cause of the blisters.

Coarse-grained Negatives This defect can only be ascribed to one cause, viz., drying negatives too slowly in hot weather, which invariably results in coarseness of grain and increased density. The fault is one rarely met with in winter, since homes and studios are usually well heated during the cold season. The use of an electric or other mechanical fan, or the help of a light air current free from dust, will completely obviate the defect.

Streaks of Patches of Uneven Density These may be caused by the use of too small a quantity of developing solution, neglect to keep the plate well covered by the developer, or by moving the negative to a different place during the process of drying. The storing of exposed plates face down in contact with paper or cardboard boxes more or less impregnated with hypo is another often unsuspected cause. I have also known this defect to be produced by touching the film of a plate with fingers not thoroughly cleansed from hypo. The remedies are obvious. Use plenty of developer to completely cover the plate; flow it over the negative with an even sweep so that every part is covered without air-bubbles or other failure to completely wet the film; set the negative to dry in a carefully chosen spot where a current of air has free access to the whole of the film, and leave it there until completely dry. Store plates after exposure exactly as the manufacturer stores them, i. e., face to face without anything between the two faces. Do not handle plates, before or after exposure, with fingers holding the slightest trace of hypo.

Printed Matter on Films Sometimes where plates are packed face to face with newspapers or other printed paper between, the printed matter will impress itself upon the film. If not too heavily marked these can be removed by gently rubbing the film with a wad of absorbent cotton charged with benzole. Sometimes immersing the plate in plain water and gentle rubbing with the finger will be effective. If the printed matter has been in contact with the film for any considerable time, however, the markings cannot be removed.

Insensitive or Opaque Bands

Those who use the English book form plate-holder, with its leather or cloth hinged slide, are sometimes troubled by the appearance of an insensitive, or it may be opaque, band crossing the plate during development. This is usually caused by the deterioration of the hinge on the slide of the holder, which if it is damp, dirty or stained, may seriously affect the sensitive surface of the plate. A thin sharp opaque line across the plate indicates, of course, that the hinge has cracked from accident or wear, and admits light to the plate.

Some years ago I was puzzled by the appearance of a sharp opaque line, with a halo of fog about it, on two plates out of every dozen exposed in a Rochester holder. Careful investigation proved that the hard rubber slides in two different holders had cracked, presumably while carried in the pocket. These cracks were so small and fine that they were discovered only by removing all the slides from my holders and carefully bending each one this way and that to probe for a possible break. I mention this simply to show that a trifling mishap to a plate-holder, too small to be apparent on casual examination, may cause troublesome defects in negatives.

String Markings

If a plate used in a hand camera, and therefore carried around for some time out of doors, develops a weird array of curved negative and positive lines resembling a tangled skein of wool, this is fair proof that the camera front or bellows has an unsuspected pinhole; or it may be that the shutter admits a minute ray of light even when closed.

Remedy: Carefully examine the interior of the camera as described on an earlier page.

Absence of Image

When the image is lacking from the lower half of the negative this gives proof that the rising front (or lensboard) was put too high, so that part of the image was cut off by the bellows; or the bellows may have sagged, as may happen with a light-weight, long-focus camera; or the lens cap may not have been completely removed during exposure; or the focusing cloth, a hand, or part of one's body or clothing may have intercepted the picture image on its way to the plate.

When a plate carefully exposed fails to show any image after careful and persistent development, the reader may be sure of one of five things, to wit: either the slide of the holder was not withdrawn, or the shutter failed to open, or the plate was not in the holder; or the developing solution lacked an essential constituent; or the exposure was too short to give even the ghost of an image or upset the inertia of the film.

Stains

It is possible that the reader's negatives have escaped the evils already enumerated. But there are still many chances for disappointment. Let us take up a few of the stains which beset the negative.

There are stains and stains. Some are desirable; others to be shunned. The craze for clear, stainless black and white negatives, with an infinite range of soft pearly gray half-tones, which came in with eikonogen and is fostered by the modern "aromatic" developing agents, will pass away in time. These developers are strictly scientific, giving an image of pure silver in gelatine—pretty negatives, but not always good printers. A certain amount of tone quality, mellowness, body-color—call it what you will—is necessary in the negative if the print is to possess force, richness, and depth. The professional knows this, and the pictorial enthusiast. They both use pyro because it gives this desirable mellowness, an image of silver plus stain in gelatine. This stain is greenish brown, yellowish black, or greenish black, according to the fancy of the worker.

From the present point of view such negatives are "slow printers," and the picture image is too much "enveloped." How to remove this yellow stain, whatever its cause, is of interest.

Yellowish Stains

Causes: The use of alkaline or impure sulphite of soda in the developer; an insufficient quantity of sulphite; the use of stale or decomposed pyro; prolonged development; transferring plates from developer to fixing bath without rinsing in water; the use of too much bromide of potassium in the developer; an old and dirty hypo fixing bath. The commonest cause is found in the quality or quantity of sulphite used. If this is properly adjusted, the color of the negative and absence of stain may be regulated to suit the individual worker's notion.

Remedies: Sulphite of soda is one of the most valuable and one of the most troublesome chemical salts used in photography. It is extremely susceptible to change, both in the dry state and in solution. For photographic use the salt should be neutral, i. e., neither alkaline nor acid. Neutral sulphite of soda, however, is rarely met with, no matter what interested manufacturers claim for their products. Wherever possible the sulphite should be purchased from a house of unquestioned reputation, packed in glass-stoppered bottles. From many samples tested it has been proven that a difference of from 10 to 25 per cent in quantity of pure salt present exists between the higher and lower grades of sulphite in the American market. In my own practice I have tested and used Seed's C. P. sulphite, and find it without fault. There may be others as good, but I have not found them.

As already advised in THE PHOTO-MINIATURE, it is always best to make up sulphite solutions by hydrometer test, not by weight, as a given weight of sulphite to-day may contain a different proportion of the pure salt to the same weight to-morrow. The sample used to secure the hydrometer figure must be of the best possible quality and in faultless condition. Variations in later supplies will then matter little, as sulphite must be added to the requisite amount of water until the hydrometer registers the figure indicated when the standard solution was prepared. All hydrometer tests must, of course, be made at approximately the same temperature to secure uniformity in the readings.

The function of the sulphite used in development being to "preserve" the reducing agent, common sense tells us that too small a proportion will fail to prevent the oxidation of the developer, hence the yellow stain. The amount of sulphite used must necessarily depend on the tendency of the developing agent to oxidize, and the amount of color desired in the finished negative.

The newer developers, eikonogen, glycin, metol, etc., require much less sulphite than pyro, the tendency of the latter to oxidize (stain) being too well known to need comment.

Unduly prolonged development, especially with pyro, causes abnormal oxidation, and this results in stain.

Transferring plates without rinsing from developers to fixing bath, although practiced by many workers, necessarily carries oxidized developer into the hypo bath, contaminating the latter, and giving rise to compounds liable to stain or veil the as yet unfixed negative. The remedy is obvious.

Bromide should be added to the developer with a full knowledge of its advantages and disadvantages. Many workers are very sparing in their use of this restrainer. Its greatest advantage is in cases of over-exposure, when the addition of a few drops of it to the developer is ofttimes essential. A large number of amateurs use bromide to excess in the belief that it will prevent fog. This is a mistaken idea. Bromide will not prevent the formation of fog, but merely retards it, as if development is extended beyond reasonable limits, fog will set in even though a large amount of the restrainer is incorporated in the solution. This excess gives the negative an olive tone.

Pyro Stain

For the removal of pyro development stains many formulæ have been given. Liesegang suggests immersing the fixed and well washed negative in a 2 per cent solution of persulphate of ammonia. This will clear the negative, the action of the persulphate being arrested at the right moment by placing the negative in a 10 per cent solution of sulphite of soda, and afterwards washing in water. This method needs care, lest the persulphate reduce the density of the negative overmuch.

Perchloride of iron (cryst.), 30 grains; citric acid, 60 grains; water, 13 ounces, also forms a clearing bath of great utility for development stains. It acts as a reducer, and should be carefully watched.

A mixture of sulphate of iron, 3 ounces; sulphuric acid, 1 ounce; alum, 1 ounce; water, 3 ounces, has also given me satisfaction. Apply the above formula

"CHUMMY"
Walter Burke

LEFT IN CHARGE
Walter Burke

after the negative has been thoroughly fixed and washed. Alum, acting somewhat analogous to acids, clears the film from developing stains, but, unless the weather is hot, the use of alum is unnecessary. It is better to reduce the temperature of the solution than employ an agent to counteract its effect, as a tender film is the probable result of saturating it with chemicals and then washing them out again.

A mixture of glycerine and strong hypo solution is also effective in removing pyro stains which resist other methods. The thick mixture is applied evenly to the surface of the negative, which is then set aside for a day or two, after which the negative is well washed.

Amidol Stains Negatives developed with amidol sometimes show dark stains. The following bath will remove them, but should be used with caution, as it works quickly: Washing soda, 50 grains; bicarbonate of soda, 4 grains; chloride of lime, 10 grains; water, 1 ounce.

Hydroquinone Stains Development with hydroquinone at times brings a stain which is very difficult to remove. Prepare the following solution: Potassium bichromate, ½ ounce; water, 25 ounces; hydrochloric acid, ¼ ounce. Leave the stained negative in this until bleached, i. e., of a pale yellow color. Then wash thoroughly until the characteristic bichromate stain is completely washed out. Then redevelop with metol or ortol until the desired density is secured.

Silver Stains When many prints are taken from unvarnished negatives, or negative and printing paper are exposed to damp or wet while in the printing frame, the negative will develop hundreds of small rusty-colored spots. These are silver stains, and can only be removed with difficulty. Mr. A. C. Tandy says he has used the following with success: Sodium hyposulphite, 2 ounces; sodium phosphate, 5 grains; lead nitrate, ¼ ounce. Dissolve in 6 ounces of water, and then add ¼ ounce of alum, after which it may be put aside to clear before using. The action of this bath seems to be to tone the silver stain in the negative right away. It also clears up the negative and makes it clean and bright. The time required to do this varies. In a bad case it takes as long as an hour and a half. The solution may be kept in a bottle and used several times. After treatment the negative must be well-washed and allowed to dry spontaneously. Should any sediment settle upon the plate it must be carefully wiped off with a tuft of wet cotton wool before drying the negative.

Robertson's method, in which two solutions are employed, is as follows: (1) Ammonium sulphocyanide, ½ dram; water, 1 ounce. (2) Nitric acid, ½ dram; water, 1 ounce. Fresh solutions should be made for each application. Add 1 to 2 and soak the negative in the solution till the stains are removed or rendered so faint as to be negligible. If the acid is added to the sulphocyanide without dilution, dangerously powerful fumes of hydrocyanic acid will be given off. Do not attempt to assist the action by rubbing with cotton wool, as the solution has a strong tendency to frill the film. A useful precaution is to protect the edges of the film with an edging of black varnish. As soon as the stains are removed soak the negative in a solution of chrome alum, wash and dry.

Blue Print Stains Stains due to contact with damp "blue print" paper may be removed by immersing the negative for five or ten minutes in strong ammonia water. In this the stains change to reddish brown. Now wash the negative for half an hour and transfer it to a bath of weak hydrochloric acid (12 minims acid to 1 ounce of water). This should completely dissolve the brown stain.

Platinum Stains A solution of ten drops of hydrochloric acid in an ounce of water is recommended for the removal of stains caused by platinum paper adhering to a negative. The method has not proved successful in my hands, but is well recommended, hence I repeat it.

Persulphate Stains The pink stain sometimes left by the use of ammonium persulphate as a reducer may be removed by immersing the negative for a few minutes in a dilute solution of oxalic acid.

Scratches *Cause:* Generally due to carelessness. The finger nails are ofttimes responsible, as, for instance, when removing the opaque paper covering which is usually wrapped around dry plates; when "feeling" for plate in developing tray or when raising paper from negative for purposes of examination during the printing process. Scratches are sometimes caused by a careless handling of the knife or sharp instrument used in opening a fresh box of plates; or by setting negatives carelessly and hurriedly in the drying rack, i. e., not placing them squarely in the grooves provided for the purpose; or laying negatives on top of each other without some protecting medium between each one; or forcing plates in and out of holders, or careless handling of negatives or plates at any time.

Remedy: Take particular pains not to permit the finger nails to come in contact with the film, wet or dry. Plates and negatives should always be grasped by the edges; holding between the thumb and finger.

Most makes of plates are wrapped in black paper, one half dozen to the package. This covering should be removed with the utmost care. The paper should be unfolded at the two ends of the package before attempting to get at the plates; otherwise, the nails are likely to mar the film during the tugging and pulling necessitated by trying to remove the plates from the incompletely unwrapped package. Never lose patience when loading plates. Take plenty of time and keep cool. Many a scratch can be avoided by remembering and following this advice.

Did you ever "lose track" of your plates in the developing or fixing trays? By this, I mean not knowing which end of the tray it is touching. And when you want to examine the fugitive, make a guess as to the end of the plate between which and the end of the tray there is a space, and guess wrongly, giving the delicate wet film a dig with your finger nails,—a scratch? This is more liable to happen if the solution is dark in color or when one is sparing in the amount of illumination in the dark-room. If this occurs again, don't hazard a guess, but hold the tray at an angle a little closer to the source of light and a glance will disclose the proper and safe place to put the finger to raise the plate,—or use a plate lifter. Then again, get a good grip on the edges of the plate before trying to lift it, as it is quite elusive and the fingers are prone to slip occasionally,—and scratches again.

When printing, do not use paper smaller in size than the negative, except it be a test slip, in which case it is preferable that it be as long as the negative, but can be as narrow as desired. Why? Because if the paper extends to neither edge of the plate, you will slip your nail underneath to raise the paper, and,—scratch the film. Turn back one corner of the slip and raise it from the negative by the flap thus made. Again, some workers have a habit of raising the paper by means of a pin or a penknife which they insert under same. This seldom fails to injure the film. In each of the above cases, I have had print-out papers in mind, where one has to make frequent examinations to see if printing has progressed far enough for the purpose intended. It is not so important that test slips of developing paper should be of any particular length, as nothing will be gained by examining the paper when it is in the printing frame. A good way to do, after giving the necessary exposure and removing the back of frame, is to tilt the negative a trifle sideways and let the paper drop into the hand.

The drying rack is a source of many scratches. Negatives should set at right angles, the edges of the glass firmly gripping the rack grooves. If this is not done, or the rack is overcrowded, the negatives may tilt sideways and knock against each other, particularly when their balance is disturbed by the removal of one or two towards the center of the rack.

Preserve negatives in a file or envelope; never stack them on top of each other unless they are so protected. It will readily be seen how easily the film may be scratched by accidental contact with the glass side or edges of an adjacent negative.

The forcing of plates in or out of holders is also productive of scratches. This would apply particularly to any but the more recent patterns; but as holders last for so long a time with ordinary care, it is quite probable that the outfits of the older workers include a few of the style I have in mind,—those where one end of the plate is used to force back a spring, allowing the free end to slip under a projecting flap. In the center of this flap a half circle is cut out intended for the introduction of the finger to again force back the spring for the removal of the plate. Sometimes this is not readily accomplished, and the nervous worker may be tempted to use a knife or pencil to effect the necessary release, and the agent employed often slips and makes an ugly scratch on the film. Even with the more modern holders there is danger of injuring the film unless due care is exercised. For instance, the kind with a sliding end, necessitating a slight pressure on the emulsion side of the plate to force it under before pushing back the movable section. The danger lies in allowing the nail to scratch the film instead of only permitting the ball of the finger or thumb to touch it.

All these matters may seem trivial, but rest assured that too many precautions cannot be taken to avoid mishaps.

After-treatment: See remarks under "Spotting Negatives." Scratches will yield to the same treatment.

Spotting Negatives

The best method of after-treatment for scratches on film or glass side, as well as for all small transparent spots of definite shape and similar defects, is a careful spotting of the negatives. This consists of filling in the holes which would otherwise show black on the positive. It is, of course, preferable to avoid the necessity for working on the negative with brush or pencil, but when these disfiguring defects do appear,—and they will occasionally with every worker, professional or amateur,—the proper and most artistic method looking toward their elimination should be sought. In writing this, I have in mind the habit which so many have of daubing on red opaque. This is a very unsatisfactory medium, quickly and easily applied, but entailing more labor in the long run than doing the work well in the first place. Red opaque certainly fills the holes, but the white spots which the filling makes on every print taken necessitates further retouching, and this means the expenditure of considerable time if many prints are needed. India ink is the medium that should be employed to fill up the large holes or scratches, applying same with a small brush, in quick, light touches. Never try to finish the work with one daub of the brush. One advantage of applying a number of touches is the opportunity it affords of noting how closely the adjacent parts of the film are matched. I know not a few workers who melt the film off a discarded negative and use this with which to fill up the holes when they penetrate through to the glass. When this filling is dry, a little retouching medium is gently rubbed over the spot and a few judicious strokes of the pencil complete the operation. If the work has been carefully done, the prints yielded by the doctored negative will not exhibit the fact that the disfiguring holes or scratches ever existed. All this takes time—in fact, very much longer than daubing on red opaque—but the results in the former case are both artistic and permanent, which cannot be said of the latter.

Glass Side Scratches

Cause: Here is one defect for the presence of which the worker cannot be held accountable; the manufacturer of the plate is alone responsible. The purest white glass only, perfectly flat and free from defects, should have been used, but that the manufacturers of some brands sometimes deviate from this rule is proven by the fact that imperfections in the glass support are by no means uncommon.

Remedy: Use another brand of plates.

After Treatment: After thoroughly cleaning the glass, fill the scratches with Canada balsam, thinned with benzole. When dry, the surplus balsam should be removed. No sign of the scratch will be visible on the print if this method is adopted.

Once properly spotted, a clean print is assured, unless the paper may have an occasional blemish, so it decidedly pays to spend time in working over a negative before placing it in the printing room. We may not only spot but remove defects as well as heighten effects, subdue others, and even if we do not understand retouching, remove deep shadows, freckles, etc., in portraits before printing.

For this work there will be required three fine sable brushes, several pencils from a very hard to quite soft grade, a retouching frame, a bottle of retouching fluid, a little gelatine, and a stick of India ink, as well as a few moist water colors, such as brown, sepia, gamboge, Prussian blue, and scarlet lake. The retouching frame may be easily constructed if one is handy with saw and nails. It is simply a convenient easel for the negative while working on it; at a pinch a printing frame with legs and a white card behind to reflect light would answer. It is well to grind up some India ink on a porcelain slab, using gelatine solution instead of water, and to have dabs of the other paints on the slab also. Some people tack a black cloth upon the frame and cover the head while working, as greater accuracy in matching can thereby be obtained.

We first fill all the largest holes and scratches with India ink, using a brush of small size, well pointed by twirling it on a blotter, never filling a hole in one dab, but rather by a series of slight touches with not too much India ink. By persistently touching the spots a little at a time, we can observe how near we come to matching the opacity of the surrounding parts, and thus, patiently filling the hole and noting the result, we can make it impossible to detect the patch. The very small pinholes are to be touched with the tip of the finest brush, using a reading glass if necessary, always remembering never to do in one touch what can be done in ten, if fine work is desired.

If the holes go clear through the emulsion to the glass they may be first filled with thick gelatine solution, and when dry touched with retouching fluid and filled with the pencil, using fine crossed strokes like a continuous figure 8. Or they may be filled with medium made of the scrapings from a worthless negative melted up in a water-bath. This latter method is a favorite one with many, as the filler, carefully laid on, is apt to match nicely. Small patches of uneven density, or transparent marks, can be filled in the same way, matching the colors carefully and skilfully.

The End Gentle reader, we must make an end of our survey. There are many more defects possible in negatives, such as halation, flatness, overmuch density, too little density, lack of gradation, etc., but these have been or will be dealt with when we take up development and other branches of negative-making and "faking."

BOOKS.

Finishing the Negative. A handbook of all the processes between fixing and printing, with a special chapter on films. Edited by George E. Brown. 160 pp., illustrated. This is the most exhaustive work on the subject in English. Its publication is promised for early in 1902. $1.00.

The Perfect Negative. A series of practical chapters on the after treatment of the negative. By F. C. Lambert. 136 pp. 1899. 50 cents.

Improving the Negative. Intensifying, Reducing and Spotting. By Henry G. Abbott. 70 pp. paper covers. 1901. 25 cents.

See also THE PHOTO-MINIATURE No 15, *Intensification and Reduction.* 1900. 25 cents.

ANTI-TRUST

PURE
COLLODION
PAPERS

MONARCH MATTE

MONARCH
TRADE MARK

MONARCH GLACE

RELIABLE
UNIFORM
PERMANENT

Three times quicker printing than any other

Prices same as other Collodion Papers

MANUFACTURED ONLY BY THE

MONARCH PAPER COMPANY

E. & H. T. ANTHONY & CO.
SOLE TRADE AGENTS
122-124 Fifth Avenue : NEW YORK

ANTI-TRUST

Kindly mention The Photo-Miniature

NOTES

According to the public prints, Miss Anna Catherine Draper, sister of the late Professor John W. Draper, died at Hastings-on-Hudson, N. Y., December 10, in her 95th year. By her relationship to her famous brother, Miss Draper was closely connected with the beginnings of photography in America, and the daguerreotype portrait of her, made by Professor Draper early in 1840, is said to have been the earliest sunlight picture of the human face. Professor John W. Draper was at that time on the teaching staff of the University of the City of New York, and the portrait mentioned was made on the roof of the old University building in Washington Square, New York. The original daguerreotype was sent by Professor Draper to his friend, Sir William John Herschel, and is still preserved by the Herschel family in England. It was exhibited at the Chicago exposition of 1893, and copies were made before it left this country.

We give Miss Draper's name as reported in the local newspapers, which should be informed in the matter. In all previous mention of the incident, Miss Draper's name is given as Dorothy Catherine. Whether there is here a confusion of names only, or of persons, we are unable to decide. In the obituary notice Miss Draper is said to have been born in England, spending the last forty years of her life at Hastings-on-Hudson, near Tarrytown, N. Y.

◆

The Camera for December, in addition to a profusion of salon prints, contains an unusually interesting supplement reproducing portraits of the editors of prominent American photographic magazines. The veteran journalists, Edward L. Wilson, Ph.D., and John Nicol, Ph.D., are given places of honor, and the younger men

CRAMER'S

Isochromatic Plates

ARE THE MOST PERFECT COLOR-SENSITIVE PLATES ON THE MARKET

ASK YOUR DEALER FOR
REDUCED PRICES ON OUR ISOCHROMATIC PLATES

Made in Three Grades of Speed:

SLOW, MEDIUM and
INSTANTANEOUS

For sale by all Dealers in Photographic Supplies

Manufactured by

G. Cramer Dry Plate Co.

ST. LOUIS, MO.

OFFICES IN
NEW YORK, No. 32 East 10th Street
CHICAGO, Room 705, Cable Building
SAN FRANCISCO, Room 38, No. 819 Market Street

Kindly mention THE PHOTO-MINIATURE

are grouped about them. Mrs. Fitzgibbon Clark, of the *St. Louis Photographer*, is the only woman appearing in this distinguished company. We are glad to see how lightly she carries the burden of her exacting office. The supplement is one which cannot readily be duplicated, and should be seen by those interested in the bright galaxy illuminating the photographic press of America, A. D. 1901. [Frank V. Chambers, Philadelphia. 10 cents.]

❦

Artists' proofs, sent out in albums or enclosures, are the latest novelty in professional portraiture, and will be welcomed as exceedingly tasteful and useful for many purposes in photography. Photographs to be finished after this fashion are made on heavy sensitized paper, sufficiently large to give a generous margin about the print without mounting. The specialty has been vigorously introduced in the *Aristo Eagle*, Nos. 9 and 10, which can be obtained from the American Aristo Company, Jamestown, N. Y., whose new Aristo-Carbon paper is peculiarly adapted for the making of artists' proof prints. The cover papers used for the enclosures can be obtained from the agents of the Niagara Paper Mills, of Lockport, N. Y.

❦

In writing the foregoing we are reminded that we have neglected to call the attention of our readers to the beautiful cover or mounting papers, made by the Niagara Paper Mills. THE PHOTO-MINIATURE is chary of its praise in mentioning commercial specialties, but the Niagara Mills products are deserving of the highest praise we can give. There is no end to the advantages and usefulness these papers offer to amateur and professional photographers, for mounts, for enclosures, covers for booklets or home-made albums and similar purposes. Their quality and distinctiveness in colorings and texture—as witness the cover of THE PHOTO-MINIATURE—will delight the man of critical taste and fastidious notion. It would be easy to write a book about their virtues, but the book could never be

THE COLLINEAR

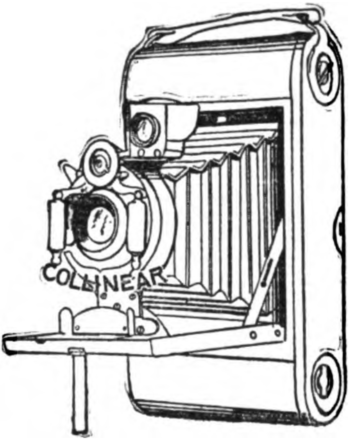
SERIES II. F 5/6

can now be fitted to the

POCKET FOLDING KODAK No. 3

No. 3 Pocket Folding Kodak, with COLLINEAR II, No. 2 and Unicum Shutter . . . $62.00.

COLLINEAR LENS and Shutter only . . . $48.00.



COLLINEAR, Series III, fits

	LENS AND SHUTTER
No. 2 Folding Pocket Kodak	$38.00
No. 3 " " "	$38.00
	LENS
No. 3 Cartridge Kodak	$40.00
No. 4 " "	$40.00
No. 5 " "	$50.00

A COLLINEAR, Series III
doubles the speed of your Kodak
COLLINEAR, Series II
quadruples it.

Sold by all dealers at uniform prices. For descriptive circular C, write to

VOIGTLAENDER & SON OPTICAL CO.
137 West 23d Street : New York

half as interesting as a sample book of the papers themselves. A word to the Niagara Paper Mills, at Lockport, N. Y., will bring the address of the nearest local agency, where the curious may see for themselves a remarkable exhibit of the products of the mills.

◆

"The Year's Photographs:" A series reproducing some of the prints shown at the exhibitions of the Royal Photographic Society, and the Photographic Salon, London, 1901. Published in (probably) twelve parts, by Iliffe & Sons, Ltd., London.

This series is published with the object of providing an adequate souvenir of the best photographic work of the year as seen at the London exhibitions. Eight half-tone reproductions are given in each part, with brief notes concerning the pictures reproduced, these notes being furnished by "an artist of standing." The selection of prints has been made with a desire to include the best work of all schools and methods. Each print is loosely tipped on to a page of special mounting paper and the text is tastefully arranged in red and black upon an ample page of cream antique paper.

When completed the work will prove an invaluable record of the progress of pictorial photography. The idea it embodies is altogether praiseworthy, and we have no doubt but that the series will meet with the success it deserves. Thus far nine separate parts have been published, comprising over seventy-two reproductions. Orders for the series should be sent direct to the publishers.

◆

In a recent paper read before an English photographic society, Mr. Claude Rippon points out that the Watkins system of development permits the amateur to use pyro in development without fear of stained fingers, for the plate need not be removed from the tray until development is completed. Another advantage of this system from the amateur's point of view is that it ensures uniformly good negatives, even though long intervals elapse between the development of different batches of expo-

EXPERTS

who have tried our Landscape and Portrait Orthochromatic plates pronounce them equal in quality to the old-time "wet plates." No higher praise can be given a dry plate—
They are also just right for the rendering of correct color values.
Order of your dealer, or write us and we will see that you are supplied.

M. A. SEED DRY PLATE CO.
ST. LOUIS, MO.: 2005 LUCAS PLACE
NEW YORK, N. Y.: 57 EAST 9TH STREET

Kindly mention THE PHOTO-MINIATURE.

sures, the use of the unvarying factor providing against failures liable to result from mistakes in judging density.

◆

Mr. George G. Rockwood sends to our table an engraving from his portrait of the late President McKinley. This portrait has been engraved by the Treasury department at Washington, and Mr. and Mrs. McKinley declared it to be "the most satisfactory of all the portraits" of the late President.

◆

An unusually complete treatise on "The Photography of Submerged Objects," by Dr. A. L. Donnadieu, has just been published by Chas. Mendel, Paris. The work deals interestingly with the difficulties of this peculiar field, and is illustrated with eight bromide prints, apart from the textual illustrations.

◆

Herr Otto Kirschten, of Eisenberg, Germany, has published a circular in which he asserts that the daily sale of his popular "Reform" dry plate now amounts to 15,000. This is the average figure per diem for the past twelve months and is an increase of 5,000 per day over the average daily sale in 1900. This statement rouses curiosity as to the sale of the popular American and English plates.

◆

The Photographic Dealer (London) quotes our recent mention of the Circulating Photographic Library of Messrs. Henry Kahn & Co., 189 Broadway, New York, and commends the idea to the British dealer as worthy of putting into practical shape. Many of our larger American dealers might also follow the suggestion with advantage. The volume of business done in photographic literature by the average dealer is surprisingly small in view of the liberal discounts offered on most photographic books.

There is a much closer connection between books and supplies than the dealer perceives. Those dealers

To attain success in Photography it is necessary to select a good camera and shutter and suitable plates, films, etc., but practically everything depends upon the lens.

For adaptation to either old or new Cameras

ROSS

LIMITED

Offer to amateur or professional photographers and process workers a greater choice and a finer selection of high-class lenses than any other manufacturer in the world.

IMPORTANT NOTICE

The Zeiss and Goerz Patent Anastigmatic Lenses are manufactured (under License) by ROSS, Ltd., at their Optical Works, Clapham Common, *exactly to formulae supplied by the patentees*; and the optical glasses and methods of construction are precisely similar to those employed by them, the only difference between the respective lenses being that the Anastigmats made by ROSS, Ltd., are mounted in the English style, and furnished with the Standard apertures of the Royal Photographic Society.

ROSS, LTD.

111 New Bond Street : : LONDON, W., ENGLAND

Sold by all Leading Dealers

Kindly mention THE PHOTO-MINIATURE

who are most successful in selling photographic books are invariably those most successful in selling supplies. The sale of a book brings a demand for new supplies and apparatus. This is too often overlooked by the dealer.

◆

Photograms of the Year 1901, A Pictorial and Literary Record of the Best Photographs of the Year. Compiled by the staff of *The Photogram*. 192 pp., profusely illustrated, 6½ x 9½ x 1 inch. Paper covers, $1. Library edition, $1.25. New York: Tennant & Ward; London; Dawbarn & Ward, Ltd.

Photograms of the Year is now so widely known and appreciated that no extended description or explanation of its purpose is necessary. To those unable to visit the great exhibitions of Britain yearly, it is an indispensable record of what is being done in pictorial photography.

The new volume is in many respects a better and more desirable record than any of its predecessors in the series, although they are full of interest. Its make-up has been handled in a broader and more catholic spirit. The various writers who had charge of its departments seem to have put more individuality into their work. This is especially evident in the Review of American Photography, and the account of the photographic section at the recent Glasgow Exposition. Here and there we find debatable assertions, but the treatment of the subject is broad and not so rigidly inclusive as in past volumes.

The two principal English exhibitions of the year are given detailed treatment from different view points, several views of the walls being given to show the arrangement of the exhibits. The complete record, with its thoughtful criticisms and suggestions, is almost as satisfactory as a personal visit accompanied by a friend able to talk interestingly of the pictures displayed on the walls of the two exhibitions.

Photography in France, Germany, Austria, Australia and Canada are dealt with by Robert Demachy, J. Hill Griffiths, Ernst Juhl, and others. Taken all in

J. Hauff's Ready Tubes

SAVE MONEY, TIME AND TROUBLE

ORTOL TUBES Sample Set, 35c

A two-solution developer for plates, papers and films

PYROL TUBES Sample Set, 25c

The best two-solution pyrogallic acid developer

J. HAUFF'S PATENTED DEVELOPERS

Metol : Ortol : Adurol : Glycin : Pyrol

BE SURE TO USE

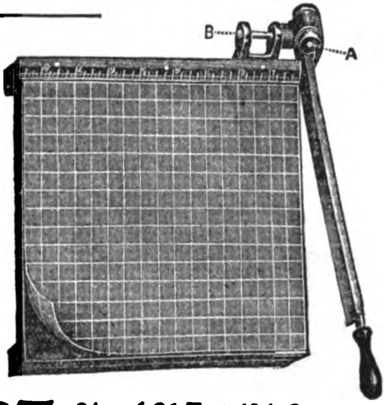
GG Chemically Pure Sodas

Can you afford to take any chances with expensive and difficult exposures? No, you require the purest chemicals. Washing soda and inferior sulphites will not make a proper developer. Take no chances, but use

GG CARBONATE OF SODIUM ANHYD. CP, 1-LB. BOTTLE, 25c
GG SULPHITE OF SODIUM ANHYD. CP, 1-LB. BOTTLE, 30c
GG CARBONATE OF POTASSIUM ANHYD. CP, 1-LB. BOTTLE, 35c

ALL ARE DOUBLE STRENGTH

STEVENS . . . PRINT TRIMMER



Special Features

Swinging knife, which insures constant contact and clean clear edges.

Transparent guide sheet to bring edges parallel to any of the lines in picture.

8½-INCH KNIFE, $3.00

NEW CATALOGUE JUST OUT

Copy for 10c in stamps

G. GENNERT

24 and 26 East 13th St.
NEW YORK

Kindly mention THE PHOTO-MINIATURE

all, *Photograms of the Year 1901* is a remarkable volume, and one which the reader at all interested in the progress of photography cannot afford to miss.

❧

As we go to press, word is received that *Penrose's Process Year-Book for 1901* has been shipped by its publishers, and may be expected here early in January. Last year's volume went out of print almost as soon as received. Those desiring copies should therefore send in their orders in advance, as the work cannot be reprinted. A detailed contents list can be had from the American agents, Tennant & Ward, New York.

❧

The editor of THE PHOTO-MINIATURE desires to obtain a clean, perfect copy, preferably bound, of *Photography Annual* for 1898. This is needed to complete his personal set of the *Annual*, and he will be glad to hear from any reader willing to supply the volume. Describe the condition of the book, whether complete, bound or unbound, and state price postpaid to the office of this magazine.

❧

What are we here for? Under this title Mr. F. Dundas Todd, editor of the *Photo Beacon*, Chicago, has written and published a little book which will interest everyone who has pondered the momentous question it embodies. In the twelve chapters of the volume, dealing in turn with The Answer, Education, Work, Intelligence, Disease, War, Commerce, Morality, Humanity, Religion and Success, the thinking man or woman will find an abundance of new starting points for thought and some strange endings. The chapter on education contains much good sense; the later chapter on religion may be best described in the vulgar phrase—"pure rot." But there—that is forcible language, the scribe knowing little or nothing about the subject.

As a stimulant, and as affording another view of a lovable co-worker in photography, *What are we here for* is well worth its price. We hope the sale of the

Bausch & Lomb

PLASTIGMAT f/6.8

The Perfect Photo Lens

Plastigmat *f*/6.8 represents the latest and highest achievements of the optician's art. It was designed with all the requirements of photography—pictorial, mechanical and optical—in view, and it meets the requirements.

It is a symmetrical anastigmat of longer focus than those heretofore produced, giving superior pictorial effect. It can be fitted to any camera and takes any shutter between its combinations. The anastigmatic and other corrections are perfect, and its speed is all that is required.

The single combinations are free from astigmatism and give pictures twice the size at same distance, or same size at twice the distance, at snapshot speed.

There is no symmetrical anastigmat equal to it

SPECIMEN PICTURES ON REQUEST

Bausch & Lomb Optical Co.

NEW YORK : ROCHESTER, N.Y. : CHICAGO

Manufacturers of the World-Famous
BAUSCH & LOMB ZEISS ANASTIGMAT LENSES
in Seven Series

Catalog Free

book will mount into the thousands, so that Mr. Todd may realize that what we are here for — the last end of man — is *happiness*. (Chicago: The Photo Beacon Co., $1.)

◆

The Savannah (Ga.) Camera Club held its annual exhibition of members' work at the club rooms during November. Over two hundred prints occupied the walls of the club, and the display gave pleasure to crowds of visitors. The popularizing of photography by such exhibitions is a good work and the Savannah Camera Club deserves praise for its enthusiasm.

◆

John Pringle & Co., 64 Wabash avenue, Chicago, who have for the past six years manufactured the odorless and practically smokeless flash powder known to fame as the S. & M. brand, are now putting it on the market direct and through jobbers under the trade name "Light." Just as a rose by any other name would smell as sweet, so we have little doubt but that "Light," alias S & M, will still exhibit the same qualities which won for it so much favor before the name was changed.

In writing for the new circulars concerning "Light," ask also for a description of the "Cinch Camera Clamp."

◆

The British Journal Photographic Almanac for 1902 bulged the editorial stocking on Christmas morning. It is, as usual, an inspiring sight, inside and out; a monument to the unflagging industry of its editor, Mr. Thomas Bedding, and to the equally persistent enterprise of the British advertiser. Let the facts speak for themselves: Size, 5 x 7 x 2½ inches; 1,560 pages; more than a hundred illustrations, including three bromide prints; a valuable monograph on Telephotography by the editor; the usual selection of practical papers by well-known writers; practical formulæ and methods arranged for ready reference; recent novelties in apparatus described, with illustrations; some patented inventions of the year; tables and miscellaneous informa-

Trade Mark

Actien-Gesellschaft für Anilin-Fabrikation, Berlin S. O.
Photographic Department

Manufacturers of the patented

Agfa-Intensifier. Name protected.

The One Solution Intensifier.

Agfa-Intensifier is a clear, colorless solution, which for use is diluted 1 part with 9 parts of water. In this the negative to be intensified is immersed, and intensification commences immediately, continuing for about 10-15 minutes, when the process is complete and the plate must be withdrawn to avoid veiling.

Agfa-Intensifier does not stain, and the whole process is absolutely complete in the one manipulation; it only remains to wash the negative.

Of all dealers.

2 oz.	4 oz.	8 oz.	16 oz.
$ 0.35	$0.60	$1.00	$1.75

Testimonials.

Mr. Jacob Schloss, New York, writes: Gentlemen: I have tried your "Agfa"-Strengthener and find it works splendidly, far better than the old time Mercury and Ammonia or Soda, and shall continue it.

Mr. F. W. Guérin, St. Louis, Mo., writes as follows: Gentlemen: Replying to yours of the 12th inst., the Intensifier is all right. I had been using the intensifier some time before you sent me that sample.

Agfa-Reducer. Name protected. Patented.

"A novel and simple process of Reduction
for Plates, Slides, or Bromide Papers."

"Always ready for use, and instantly prepared."

Only to be dissolved in 10 parts of water.
Complete reduction takes about five minutes.

Of all Dealers.

$0.80 per original bottle of 4 oz. with screw-lid and hollow glass-stopper, serving as measure.

$1 per box of ten glass-tubes containing ten grams each.

EIKONOGEN ★ AMIDOL

RODINAL ★ DIOGEN

★ IMOGEN ★

tion; an epitome of photographic progress in 1901, and several hundred other items which are not classified.

It is true that two-thirds of the bulky volume consists of advertisements, but these are quite as interesting as the remainder of the book. Apart from the advertisement section, it is remarkable to see how much information Mr. Bedding has packed into the space at his disposal. The editor's monograph on Telephotography, for instance, gives a readable survey of this special field and its literature. This alone is worth the price of the volume. We learn that the whole edition of 20,800 copies was sold before publication, which briefly expresses the world's appreciation of the Almanac. American readers will do well to bespeak a copy as early as possible. G. Gennert, 24 East 13th street, New York, is the American agent for the Almanac, and the price is 75 cents, postage 20 cents extra when mailed.

⁂

A new and enlarged edition of "Shakespeare's Town and Times," by H. Snowden Ward and Catharine Weed Ward, is announced as ready for delivery. The new edition has four photogravure plates, and is in every way an improvement upon the earlier edition. "Shakespeare's Town and Times" tells the story of the man and his environment in a happier way, and is more interestingly illustrated than many more ambitious books in its field. We gladly bring the volume before our readers. Price, 16/6 net: postage, 6d. London: Dawbarn & Ward, Ltd.

⁂

The American Annual of Photography for 1902, which appeared about the middle of December, makes up in pictorial attractiveness what it lacks in bulk when compared with the *British Journal Almanac*. The frontispiece is a photogravure from a negative by the Campbell studio (R. Eickemeyer, Jr.), and the illustrations throughout the volume are excellent half-tones, carefully printed in various colors. Among the papers worthy of mention are The Mystery of Development, by Dr. John Nicol; Art *vs.* Records, by John Aspinwall;

Subject to no restrictions of Trade, and thus available to *all* dealers throughout the country, ROTOGRAPH NEGATIVE PAPER, in cut sheets from the smallest to the largest sizes, is bound to have an immense demand among both the beginner who desires to save expenses, and the more advanced photographer who works in large sizes and uses rough platinum, carbon and gum paper for his printing media.

Explicit directions in each package

We are now ready to quote prices and send circulars regarding this new product.

"Rotograph"

101 FIFTH AVE., NEW YORK

B. RUSEGGER, E. S. MAPES
Selling Agents

Sloppiness in the Platinum Process and its Effect, by Alfred Stieglitz; Handwriting Photography, by W. J. Kinsley; Flower and Fruit Studies, by Lewis F. Stephany; High Speed Work, by Walter Burke; Mushroom or Toadstool? by W. H. Walmsley; and on Direct and Reversed Photography, by Francis E. Nipher. Mr. Walter P. Stokes describes and illustrates an adjustable photographic stand strangely similar to that first described by Mr. J. Horace McFarland in THE PHOTO-MINIATURE No. 13. Altogether *The American Annual* fully sustains its reputation, and the editor, Mr. Walter E. Woodbury, has every reason to be proud of its achievement. Price, 75 cts. Postage 16 cents extra.

◆

A light weight but really reliable sheath for the use of cut films and paper negatives in the ordinary plate holder has long been desired. We note with pleasure that John Carbutt, the veteran plate manufacturer, Wayne Junction, Philadelphia, has met all requirements. The Carbutt aluminum film sheaths, just introduced, are as perfect an article of the sort as one need look for, flat, extremely light, provided with three turned-over edges wide enough to securely hold the film or paper, well constructed and coated with matt black. Films or paper negatives in these sheaths may, of course, be mailed conveniently and at a very slight cost. The sheaths are obtainable in all the popular sizes up to 5 x 7 and are marketed at a reasonable figure considering the material and careful manufacture. Twelve 4 x 5 films in sheaths weigh 7½ ounces; twelve 4 x 5 glass plates weigh 19½ ounces. This is an argument which needs no further comment.

◆

The competition for prints made on Rotograph Bromide paper, so extensively announced during the year, closed November 15, and the judges met December 5 to pass on the prints sent in. Of the 1,000 prints submitted, 630 were contact prints, 4 x 5, and larger; 250 were enlargements, and the remainder were bromide post cards. Of the judges appointed Mr. B. J. Falk

JUST OUT

A Plate Attachment

FOR NO. 3 FOLDING POCKET KODAK

HAVE ONE FITTED TO YOURS

Enables you to focus the picture on the ground-glass and to use both Films and Plates. ***Practical. Reasonable.*** We also fit our celebrated Double Anastigmat Lens to this Kodak. No. 3 Folding Pocket Kodak, with Goerz Lens, Tib Automatic Shutter and Plate Attachment, with six holders, complete, $62.80, *net* cash. Plate Attachment and Six Holders, $7.65, *net.*

Write for Catalogue and further information to your Dealer, or

C. P. GOERZ

Optical Works

52 E. Union Square, New York

was unavoidably absent, so that the prints were judged by Mr. E. B. Core, Mr. Alfred Stieglitz, and Mr. John A. Tennant, of New York, with Mr. F. Dundas Todd, of Chicago.

Each class was taken separately, the unworthy prints laid aside after individual examination, and the remainder were marked by each judge separately on the basis of sixty marks for technique, and forty marks for pictorial and general treatment of the subject.

The grand prize ($200) was awarded to Oscar Maurer, of San Francisco. The first and second prizes in the contact print class, $75 and $25 respectively, fell to John Dolman, Philadelphia, and W. G. Littleton, Philadelphia, in the order given. The first prize in the enlargement class ($75) was secured by Oscar Maurer; the second prize ($25) by William C. Motteram, Philadelphia, who also won two smaller awards in this class. L. W. Brownell, New York, was awarded the first prize ($30) in the Post Card class, and the second prize ($10) fell to G. E. Keller, of Buffalo, N. Y.

A detailed list of the awards appears in the current issue of the *Bromide Monthly*, which can be had on request from Rotograph, 101 Fifth avenue, New York. The prints submitted in competition made a remarkable showing of the possibilities of the Rotograph papers, and the competition was a decided success, considering the very recent introduction of Rotograph papers in this country. A selection of the successful prints is to be shown at the New York Camera Club during the month.

◆

Photography as a Fine Art. The Achievements and Possibilities of Photographic Art in America. By Chas. H. Caffin. 200 pages, profusely illustrated, 8 x 10½ x 1 inch. Cloth, $3.00 net. For sale by Tennant & Ward, New York.

Mr. Caffin, well known as an art critic of national reputation, has prepared this work to substantiate the claim that photography should be considered as one of the fine arts. It is the first book to be published wherein photography is considered from the view point

SPURR'S

SODIUM

Is a combination of sodium salts prepared in dry form, 2½ times stronger than soda crystals . . . . .

In comparing the cost of

SPURR'S SODIUM

Remember it is two and a half times stronger than Crystals, and that one pound Sodium and one ounce Pyro will make four gallons of developer that cannot be equaled in quality by any other known formula. The leading operators of the day are using it and speak of its merits. If you want fine chemical effects, with detail in both high-lights and shadows, you cannot get it with impure and cheap chemicals. You will also be surprised to find your fingers are not all stained when using Sodium.

St. Joseph, Mo.

In reply to your inquiry, I would say the fact that I have used your chemicals for producing the negatives for our exhibit at Detroit meeting of the P. A. of A., is the best evidence that I am pleased with them.
Yours truly,
L. G. Bigelow.

For Sale by all Photo Stock Dealers

PRICES:

1-lb. can, 35 cts.; ½-lb. can, 20 cts.

BURKE & JAMES

Sole Manufacturers of Spurr's Specialties

118 to 132 W. Jackson Boulevard, Chicago

Kindly mention The Photo-Miniature

of the painter. The development of the photograph from the first sun picture of the human face down to the work of J. Craig Annan is carefully considered. The personalities of many prominent pictorial photographers are skilfully analyzed, and the principles of pictorial photography are set forth in a suggestive and helpful way. The volume is abundantly illustrated with eighty-five half-tone engravings, reproducing the work of Alfred Stieglitz, J. Craig Annan, Mrs. Käsebier, Frank Eugene, Joseph T. Keiley, Clarence H. White, William B. Dyer, J. Ridgway Moore, Edward J. Steichen, Eva Lawrence Watson, F. Holland Day, Julian A. Dimock, and Charles I. Berg.

As a thoughtful review of the achievements of the American pictorial school in photography the volume is one of rare interest. Mr. Caffin writes with a full knowledge of his subject, and his handling of it commends itself by its saneness and freedom from hifalutin. It is a book which should have an honored place on every photographer's bookshelf as a magnificent record of things done in our own time, and as a source of inspiration for the years to come.

❧

The Rev. John Brittan Clark, pastor of the Westminster Presbyterian church, 1014 Cass avenue, Detroit, Mich., desires a few "good, clear and strong" negatives of scenes in and about New York harbor, Brooklyn, noted buildings, etc., for the purpose of making lantern slides. Those who have duplicate negatives of such scenes and are willing to dispose of them at the rate of two negatives for 25 cents, are asked to put themselves in communication with Mr. Clark.

❧

The third Photographic and Optical Trades Exhibition is announced to be held at the Portman Rooms, Baker street, W. London, April 11–19, 1902. The two previous exhibitions proved most successful and attracted buyers and interested visitors from all parts of the world. A new section is to be added this year devoted to purely optical manufactures, such as spectacles, binoculars, microscopes, etc.

MILLEN'S
French Satin, Jr.

THE STANDARD blue print paper of the world, with its record of nearly fifteen years, has passed the need of special mention. Everyone knows it—everyone uses it—everyone has satisfaction and pleasure in using it. Always best, now better than ever, and we do not slacken our efforts to increase its excellence. It is made perfectly and packed perfectly in sealed tin tubes, and WHILE IN THESE TUBES will keep indefinitely. We were the first to devise and carry out this method of packing, and though imitators have since sprung up, they only imitate the package, not the contents. There can be no better blue print paper than FRENCH SATIN, JR. that is our first and last word.

J. C. MILLEN, M.D.
DENVER, COLORADO

Kindly mention THE PHOTO-MINIATURE

We trust that American manufacturers of photographic and optical specialties will be prominently represented at the forthcoming exhibition, which presents an unusual opportunity for the display of novelties and staples. Communications should be addressed, as early as possible, to the manager, Arthur C. Brookes, Harp Alley, Farringdon street, London.

◆

Mr. Charles E. Craven, photographer, Kane, Pa., favors us with a very practical booklet published as an advertisement of his business, and entitled: *Suggestions on How to Sit for a Picture.* We quote: "Delicate flowers or jewels may fitly bedeck a woman's crown of glory, yet beautiful simplicity often lends greater charm in a portrait.

"Dame Fashion may suggest parting the hair at the middle, but for picture making no one should perpetrate the crime of plastering the hair down with soap, glue or beeswax."

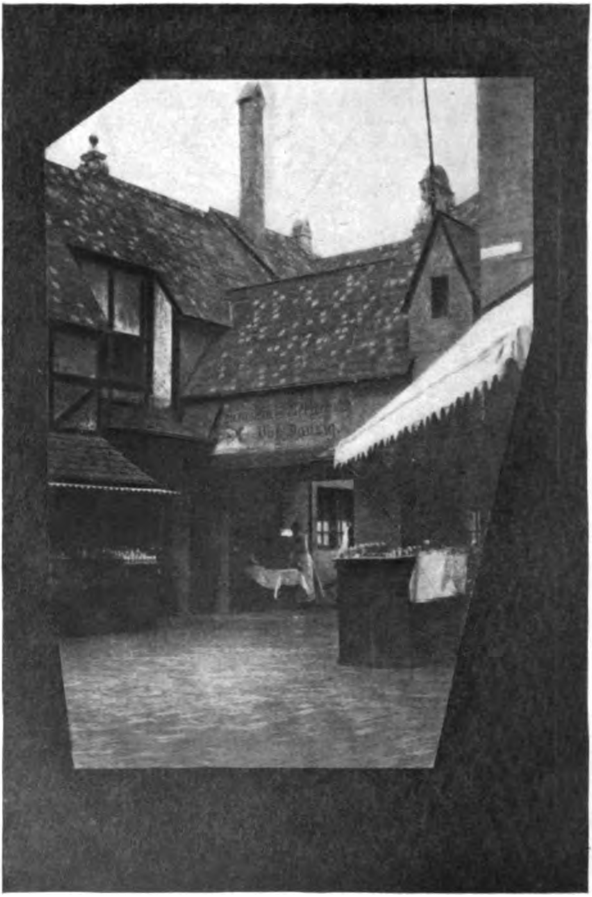
The common sense of these extracts is convincing, and we are confident that Mr. Craven's booklet is a business bringer.

◆

The twenty-second annual exhibition of the New York Microscopical Society was held at the Mott Memorial Library, 64 Madison avenue, New York, on the evening of December 6. The thirty-two exhibits displayed were extremely interesting, and the Society's rooms were filled to overflowing with enthusiastic students of microscopy and their friends.

◆

An energetic effort is making in England to secure the compulsory adoption of the metric system of weights and measures in place of the cumbersome and antiquated measures now in general use.



ALT NÜRNBURG: AT THE PAN-AMERICAN EXPOSITION

F. A. Waugh

The trimming of the print, writes Mr. Waugh, has been carefully considered to recall the many-angled aspect of the scene.

The Photo-Miniature
A Magazine of Photographic Information
EDITED BY JOHN A. TENNANT
Volume III DECEMBER, 1901 Number 33

THE DARK-ROOM

The dark-room is a prime necessity to every photographer—with certain exceptions. The exceptions belong to the you-push-the-button-we-do-the-rest class. It is rather a large class, to be sure, and not altogether unworthy of respect. Its members, equipped with cameras which load in daylight, and willing to employ the services of some one else for development, are independent of all the vexations and pleasures of the dark-room. But for the most part the members of this sect sooner or later pass over to the majority. They begin a flirtation with Pyro and Hypo,—twin gods before whom camera-men and camera-women have worshipped, from Adam down to Mr. F. Holland Day.

When the amateur in photography gets the notion that he wants to develop his own plates or films then the real trouble has begun,—and the real fun. The satisfaction of photography is more than doubled, I should say easily quadrupled, when we develop our own negatives, give the necessary after-treatment with our own hands, and make our own prints.

The beginning of the whole matter is the dark-room development of the latent image. That is a red-letter day in the young photographer's life when, for the first time, he holds the plate up to the ruby window and sees the image grow upon it. Presently he comes out of the dark-room, inspires a deep breath of fresh air, and the world is not what it was before. The photographer himself is a new man, with yellow stains on his finger nails.

Perhaps nine-tenths of the world's photographers use the dark-room, and to them it is the one absolute necessity. Plates can be exposed without camera or lens, but they can not be developed without a dark-room of some sort. In the ordinary course of photographic life something more than two-thirds of all the work is done here, and it is the most delicate and fruitful work which the photographer attempts.

It is something enlightening to see what a pride an old photographer takes in a good dark-room. Its various appointments and conveniences are of his own thought and contrivance. Everything he sees there speaks to him of dozens of joyful successes and an equal number of only half-regretted failures.

But why continue to speak of the importance of the dark-room? Everybody knows and believes in it already. Let us get at the practical business of building and equipping one for ourselves.

Essentials

Before going on to speak of the details of dark-room construction and equipment, it may be well to discuss the general requirements. These may be conveniently put under three heads: light, water and air. All three of these are needed in some degree and in some way in the dark-room; and many of the principal problems of photographic manipulation rest on the proper control of these three elements.

About Light

When we speak of a dark-room we use the adjective part of the term in a relative sense, but within narrow limits. We do not mean a darkened room, like the farmhouse parlor, the dining-room in a New York flat, or even like the library alcove where Elizabeth receives the calls of her fiancé. I have heard of amateurs filling their plate-holders during the afternoon in an ordinary sitting-room with the shades drawn. A photographic dark-room is a very dark room compared with everything we ordinarily know in other affairs of life. Yet it usually has some light,—enough to work by. Just how much light the dark-room should have has been considered sometimes to be a matter of opinion. Some people insist on having sufficient light to permit the reading of a newspaper while development is going on.

But it really shouldn't be a matter of opinion. We want all the light we can get without endangering our plates. A simple test will tell whether our plates are in danger; and after some study and experiment we will learn that different kinds of lights and windows give differing amounts of illumination with an equal margin of safety. Naturally we will then choose that means of illumination which gives the greatest amount of light compatible with good work.

Window Versus Lamp

There are two methods of lighting the dark-room. We may use either a lamp or we may have a window with a light placed opposite it outside the work-room. Sometimes this window opens directly against the sunlight or faces the open sky, which is a very good way; but even then we will need the help of a lamp at times. The dark-room occasionally has to be used at night. If the lamp method of illumination is chosen, then there is little for it except to buy a good lamp. A good lamp is one which gives a safe light, easily adjusted; that does not smoke and smell, and does not leak white light at the joints. Not all the dark-room lamps sold by supply houses are good and reliable. Beware of the very cheap lamps. A good lamp is worth its price. Sometimes the reader may find himself in great need of a dark-room lamp when beyond reach of the friendly dealer. If he can get a bit of orange-red paper, ruby fabric, or even yellow "post-office" paper, he can make a lamp by putting a candle in a cigar-box and covering one side of the box with the paper or fabric. If this improvised lamp is required to burn any length of time, ventilation must be provided. To secure this, bore a few gimlet-holes in the top and in the bottom of the box, place the box on a loosely folded piece of black cloth, and put an old black hat over the top. This piece of apparatus is neither pretty nor altogether reliable, but it may help someone out of a tight scrape. Small folding ruby lamps are so inexpensive, however, that the traveler should invariably include one in his equipment for just such an emergency, despite the warning already given against cheap lamps. These can be found in the catalogues of almost all supply houses.

Farmer's Bichromate Lamps

Since the whole problem of dark-room illumination resolves itself into the construction of a filter which will absorb the actinic rays of the spectrum while transmitting a maximum quantity of the non-actinic rays, there is a large field for experiment offered in the comparison of various light-filters. Extensive and interesting investigations by Mr. Howard Farmer, reported to the Royal Photographic Society (London) in 1898, showed that the various sorts of orange and ruby glass and fabrics in common use transmit only 40 per cent or less of the light—usually much less, the average being below 10 per cent. He also showed that various coloring matters in solution were able to transmit much larger amounts of non-actinic light. For instance, a 6 per cent solution of potassium bichromate, giving the same safety as an ordinary orange glass, furnished 254 times the amount of illumination. With other solutions the differences were still greater, but the potassium bichromate seems to be the best for general use.

As a practicable means of using the bichromate solution for a dark-room light, Mr. Farmer designed the lamp illustrated in Figure 1. This consists of two concentric glass cylinders about 4 and 5 inches in diameter respectively, placed one inside the other, mounted on a suitable base and furnished with a perforated cap. In the cap there is mounted an ordinary incandescent electric lamp attached to a wire circuit introduced through the perforation. This lamp may be moved about from place to place in the dark-room, and will prove a remarkable convenience in laboratory work.

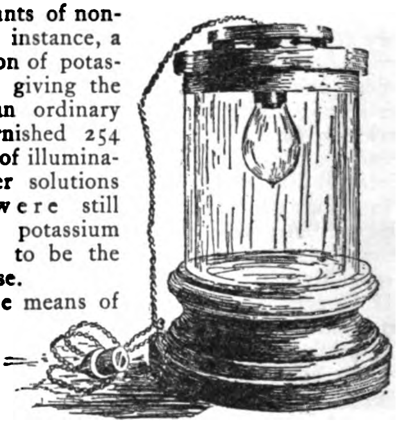


FIG. 1. Farmer's Bichromate Lamp.

The application of the bichromate filter to gas-lights or to daylight illumination seems never yet to have been made. A fairly skilful mechanic, however, ought to be able to contrive the necessary modifications without great difficulty or expense.

The Dark-room Window

It is customary, if my observation teaches me anything, to make a small window for the red light of the dark-room. I should say that 14 x 16 inches is about the average size. This is smaller than need be. A much larger window can just as well be made, and will prove much more comfortable to work by. My own window contains three lights of 10 x 12 glass, and it might just as well have been twice as big. Safety does not lie so much in the size of the window as in the provision of a suitable covering for it.

It is usually an advantage to have the red window made so that it will slide or swing. Sometimes this is the most practicable means of ventilation. In my dark-room the red window is hinged at the top, and may be swung up out of the way, where it catches with a snap. This brings me facing a ground glass window which is placed in a frame behind the red window. The ground glass comes into play very nicely when several negatives are to be taken out of the fixing bath for examination by transmitted light. The ground glass window can be opened in turn, but since ventilation does not require it, it is seldom moved.

The red window in my dark-room is placed at a considerable angle — perhaps fifteen degrees — with the vertical plane of the side of the room. The bottom slants inward. Thus the bottom of the window frame projects over the developing shelf about four inches, making a sort of a recess underneath. The tray, when shoved to the back of the shelf, is in total darkness, the light being delivered upward. This is my own notion, and I do not know whether it has any value or not. In many dark-rooms, however, I know that the light shines directly into the tray during development, unless the tray is specially covered. Covering the tray is a nuisance, and neglecting to do so under such circumstances is unmitigated carelessness, especially if we are using a very sensitive orthochromatic plate. Some of these are best developed or handled in absolute darkness.

Covering for the Window

Various coverings or filters are used for dark-room windows. Orange glass, ruby glass and ruby fabric, red, green and yellow tissue papers are the most common. Ruby glass has the preference of these, both in theory and in practice, at least for the rapid gelatino-bromide plates commonly used in this country. For color differentiating plates, of course, special "safe lights" are essential. The whole philosophy of these coverings is that they act as a light filter, absorbing the blue and violet rays of light which act most energetically on the sensitive plate, and permitting only some of the red rays to pass, which are comparatively inactive. Other sorts of light filters can be made in the laboratory, the best ones being contrived of coloring matters in solution, like the little bichromate or chrome alum cells which are sometimes used as ray filters in front of the photographic lens. But such filters have never yet been arranged in a way to be practicable for dark-room lighting, except in the manner noted in a foregoing paragraph. Ruby glass and ruby paper being the commonest materials for the purposes in hand it is well to study them most closely. It will be found on test that they vary immensely in their efficiency as light filters. Some transmit more red light than others, and yet are safer at the same time. It is impossible, at least without considerable experience, to tell which of two samples of glass or fabric is the better. The way to do is to test them, as explained in the following paragraph.

Testing the Light

Whatever method of lighting may be adopted, it must be perfectly safe. Safety first, convenience afterward. As soon as a new light is installed, a new lamp bought, or any important change made in the dark-room appointments, the light should be tested. When a new darkroom is built, this is one of the first matters to receive attention. The way to make the test is this: Take a fresh unexposed plate of the most sensitive emulsion at hand and place it face down in a printing-frame. Lay a strip of black paper across the face of the plate and close the frame. Place the frame facing the light under test, and as near to the lamp or window as plates are ever allowed to come in development. Allow the plate to be exposed thus in the printing-frame for ten minutes. Remove it and develop in a strong developer—that is, one suitable for underexposure. If the strip covered by the black paper is distinguishable from the openly exposed part, then the light has acted on the plate and the illumination may be considered unsafe.

Inasmuch as properly made orthochromatic plates are more sensitive to the yellow and red rays than ordinary plates are, it follows that greater caution must be exercised in the choice of a light for their manipulation. In a dark-room where orthochromatic plates are to be used the light should always be specially tested with such plates. When we change from an old brand of plates to a new one the light should again be carefully tested.

Plenty of Water

The perfect dark-room must have plenty of water. Thus the plumbing comes to be a matter of first consequence. Wherever the dark-room is built in a house which is piped and supplied with water there are no unusual difficulties—that is, nothing more than one always has with a plumber. In a house which is not furnished with a piped water supply it is almost impossible to build the ideal dark-room. Some substitutes may be invented, as suggested in the following paragraphs, but they fall a long way short of the continuous and practically inexhaustible stream which flows from the city water-tap—at so much a thousand feet.

It is most convenient to have at least two taps in the room. One of these may be a large one for drawing water in quantity for flushing a plate held in the hand and other general purposes. It is best to have this supplied with a rubber nozzle or rose. The other may be smaller—say ⅜-inch, to which a small rubber tube is easily fitted for the plate-washing box. Personally I like to have the smaller tap at the left, with the washing-box there. This allows me to develop at the right end of the shelf, fix at the left and pass still on to the left to the washing-box. I always work from right to left, like a Hebrew reads his paper. Of course any other arrangement is just as good, providing it suits the habits of the man who works in the room. I mention this only to say that many of these points of arrangement are merely adaptations to each man's own whims; they are, therefore, to be decided only on the basis of personal experience.

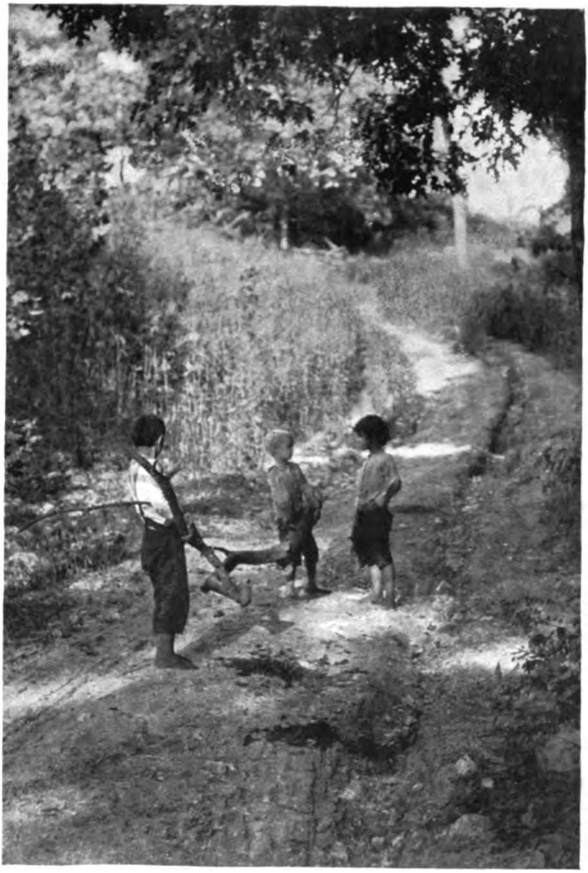
Perhaps this is as good a place as any to remind the beginner that in arranging his water supply he should plan to have plenty of distilled water if he can get it. It is very useful in making up solutions, particularly developers, intensifiers and the like.

Substitutes for Plumbing

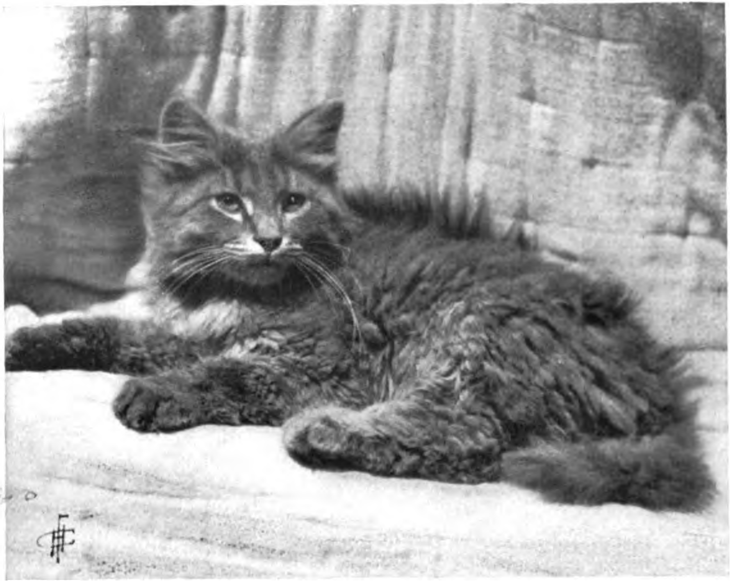
Many good photographers inhabit houses which are not connected with the city water works, and which do not have water pipes running about conveniently here and there. Even in houses or offices where the water supply is above suspicion it is sometimes impracticable to arrange such plumbing as would serve the more or less temporary dark-room. In such cases recourse has to be taken to some other means of washing plates. As a last resort, of course, one can carry a pail or two of water into the work-room and pour it over the plates with a dipper, or the plates can be soused and soused up and down in the pail. This may sound like hard times to the man who has not tried it, but it is not so bad after all, and the results are the same as when a five-dollar wash-box is used.

Convenient temporary washing apparatus can be arranged with a little ingenuity. One of the best schemes is to place a cask—half-barrel, quarter-barrel or beer keg—on a shelf or table to serve as a water tank. The water may be drawn from this either by a faucet or by a siphon, and with the help of a rubber tube can be conducted to the improvised wash-box. This had better be some sort of tin or wooden box in which the plates can stand up on edge, just as they do in the regular wash-box. The rubber tube should run down into this wash-box, discharging the water at the bottom. The water should then overflow at the one side, where it can be led, by means of a little trough, a pipe, or another piece of rubber tubing, into another cask.

The simplest of all automatic washing devices is



AN EPISODE
E. J. Davison



F. H. Collins

made with a single piece of rubber tubing, two pails and a tray, arranged as shown in the accompanying cut, Fig. 2. The first pail is filled with water and placed on a chair, rather a high chair being preferred. The water is drawn over the side of the pail through a siphon of rubber tubing, and discharges upon the plate which is placed in a tray. The tray sits on a box of suitable height. From the tray the water overflows into a second pail which is placed on the floor. This overflow may be secured from the tip of the tray, allowing the lipped corner to project over the box support, or it may be managed by the use of a second siphon like the first.

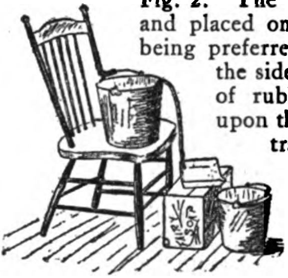


FIG. 2.
The simplest sort of plumbing.

Ventilation

I approach the subject of ventilation with reluctance, for I can not give any useful directions in the matter. Each dark-room is a problem in itself, and ventilation is the most local and peculiar feature of the problem. Certainly there must be some sort of ventilation if the room is to be used much. The air in a small room gets stuffy and bad with remarkable ease. At one time it was my ill luck to share a dark-room with a jolly good fellow who said that he didn't see the use of being an amateur photographer if one couldn't smoke in the dark-room. And he used to smoke there by the hour—smoke cigarettes! *Der Unverschämte!*

A real ventilator can usually be built into the dark-room when it is first made if one has the help of a good architect or even of a good builder. This consists chiefly of an opening in the top of the room, or near it, which discharges the vitiated air into a flue or out of doors. The opening is protected by blackened projections in such a way that no light is admitted. A somewhat similar opening or register in the floor or near it, similarly protected against the light, completes the simple but effective device.

When the room is not too small, and when it is not used too frequently or by too many persons, it is sometimes possible to do fairly well without any special ventilating apparatus. The doors and windows can be left open except during the comparatively short time of development, or during the shorter time required to exchange plates. This is the sort of ventilation the majority of amateurs and small workers depend on, I think. Such a scheme is not so bad when one has an unclosed entrance, such as is described in another paragraph further on.

The Door

Something special ought to be said about the door. The chief difficulty in getting a dark-room to be dark lies in fitting the door. If the door is specially made for the purpose it should be very carefully fitted, and if it is not specially made for the place it should be fitted with double care. It is frequently necessary to have the edges reinforced with a strip of felt tacked on all around, which helps the door to shut tightly into the frame. Or the felt may be tacked into the frame if preferred. In rooms which are used only intermittently for photographic work the doors may be temporarily darkened at need by hanging a heavy blanket over them.

Another caution: Be careful of the key-hole.

Probably the most satisfactory way of arranging the entrance to a well-built dark-room is to have it through a vestibule. This plan is shown in the sketch on another page, Fig. 3. It is comparatively easy to make such a door perfectly light-safe. Besides the safety of the vestibuled door it comes to be a provision of the utmost convenience in practical work, for it will allow us to go out and in during the development or exposure of plates. If we wish to leave the plates in the developer while we go to prepare a new solution or attend to some other matter, we have only to step into the vestibule, close the inside door after us, and pass on into outer light. One who has not used such a room can not imagine how often such a door comes as a sweet relief.

The most convenient plan of all is, doubtless, to have a door which neither opens nor shuts. This is made of several wings, at least three or four, depending on the illumination of the room out of which the dark-room opens, these wings projecting past one another and being painted or papered in black. We enter such a dark-room as though we were threading a short labyrinth, passing first to the left and then to the right three or four times, until we find ourselves facing the red screen. Once used to this construction, the projecting walls do not give any inconvenience. Such an entrance wastes a little room, but it has no other disadvantages, while it has a few positive advantages and is generally adopted in camera clubs, or where much dark-room work is to be done. It is more easy to make this scheme effective than one might suppose who had never seen it tried.

A Classification

We are now ready to consider the arrangement of the dark-room itself. Simply to make the presentation of the subject easier we may divide dark-rooms into three general classes. These are as follows: (1) Permanent dark-rooms, such as are built from the outset for photographic work and intended for that alone. (2) Made-over dark-rooms, constructed somewhat tentatively, with the notion of economizing space and money. (3) Temporary makeshifts, which are dark-rooms only while the curtains are drawn, and at other times serve as clothes presses, closets of various kinds or bath-rooms. The best way will doubtless be to discuss these in the order here given.

Space Required

For a permanent dark-room the space required will vary greatly acccording to the nature and amount of work to be done. That is obvious. Yet the limits of space may be stated rather closely. A room six feet square may be looked on as the smallest allowable. I know some men work in less room, but it is hardly worth while to build permanent quarters unless one can do at least as well as that. On the other limit there is no need for a room larger than 8 x 12, unless it be in large commercial establishments where several workers are employed. A dark-room, like a parlor, may easily be too big.

There is a great deal in having everything cozy and handy. My own dreams figure a room about 8 x 10, or a few inches less, with a vestibule, hereinafter specified.

A Typical Case

Let us suppose first that we are going to build a new dark-room "from the ground up," and that we are so situated that we can make it just as we please within reasonable limits. The accompanying plan, Figure 3, gives the writer's notion of a small and comfortable dark-room for ordinary work, and for the use of one person. The dark-room proper is just a trifle over 6 x 6 feet in size, and should be 8 to 10 feet in height. Of course the height of the adjoining rooms is likely to determine the height of the dark chamber; but it should not be too low. A good volume of air in the dark-room is always a luxury. In this plan we have a work bench, *c*, 30 inches long by 14 inches wide which should be 28 inches from the floor. In my own room this bench is cut lengthwise with several deep grooves, and has a bead a half-inch high running along the front edge. Thus when a tray gets slopped over the waste liquid runs off into the sink instead of all over my new trousers. The

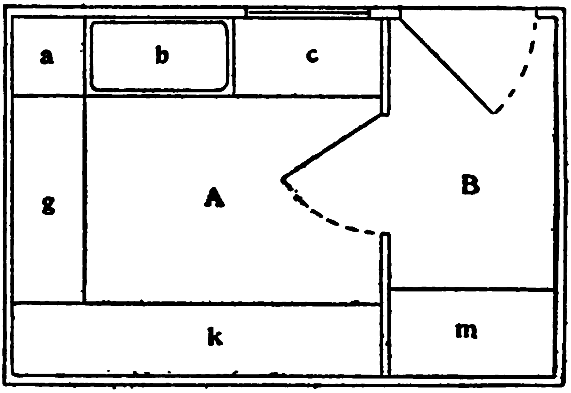
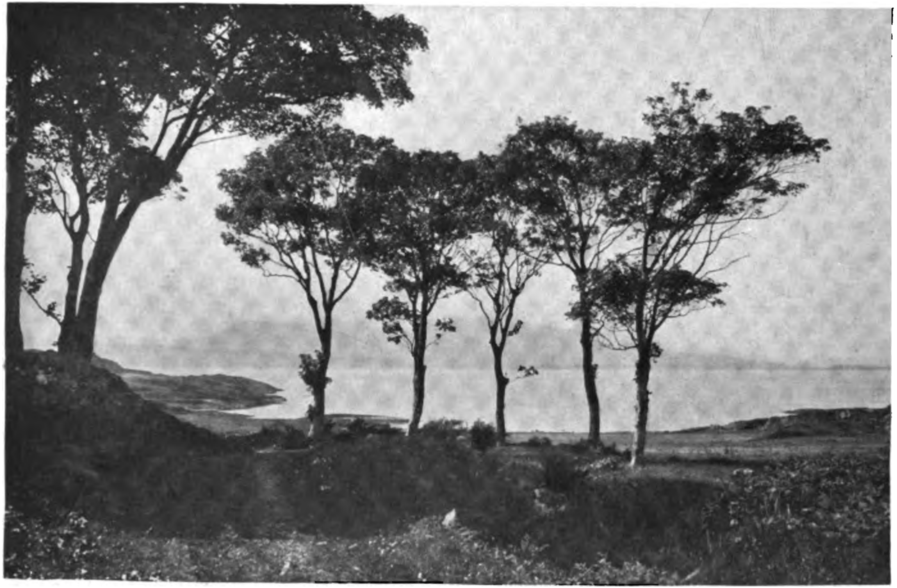
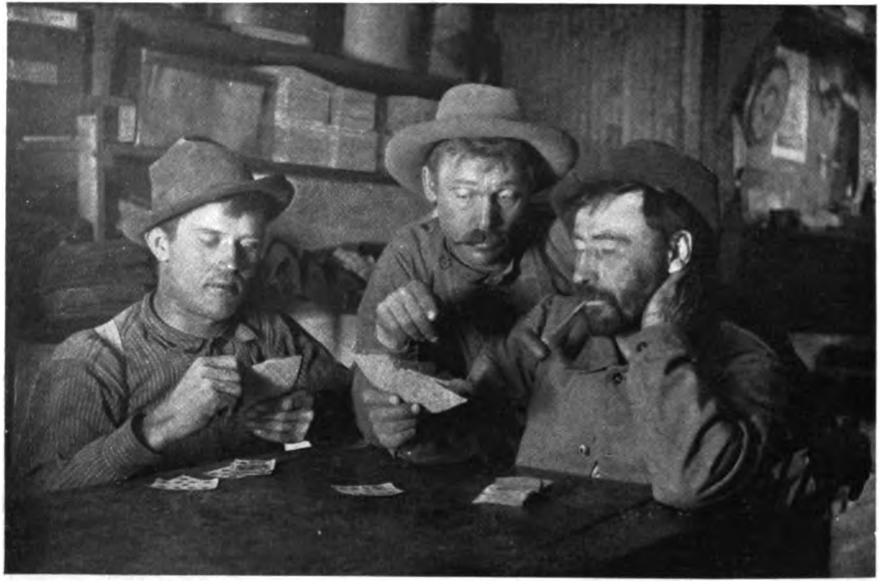


FIG. 3. Plan of a model darkroom.



ISLE OF FERRERA, HIGHLANDS OF SCOTLAND
R. D. Brown



A HITCH IN THE GAME
Sara W. Holm

work table fronts the light, which in this case is furnished by a window. A kerosene, gas or electric lamp can be fixed opposite this window on the outside, according to convenience.

At the left of the developing table is the sink, which should be furnished with two or more water taps above, as explained under plumbing, and should have a waste pipe provided with a good trap. The sink here is shown to be 30 inches long. It should be larger rather than smaller, and should be 3 or 4 inches deep. It should be a good porcelain or lead-lined sink, or else should be coated inside with black asphaltum varnish, which can be bought wherever paints and varnishes are sold. It is my custom to keep the negative washbox in the sink, but if the water from that piece of apparatus can be discharged through a tube or spout the box may just as well sit on the shelf *a*. This shelf *a*, 12 x 14 inches in size, is placed at the left of the sink, and its special use is to serve as a stand for the fixing bath. It should be on a level with the shelf *c*, and practically on a level also with the top of the sink.

The shelf *g* is 12 inches wide, and runs across the end of the room. It is intended to receive miscellaneous trays containing alum, hypo, or toning solutions, or any of those odd and necessary things which are usually not planned for, but which always have to come.

The shelf *k* is 12 inches wide, and runs the entire length of the room at the back. This shelf is for handling plates, emptying or filling plate-holders, and such like work. It should be kept scrupulously clean and dry. In case there is no chance to carry on the work of weighing chemicals and making up solutions outside the dark-room, as hereinafter provided, then it will be better to use the shelf *g* for that sort of dirtier work, and still keep the shelf *k* clean for handling plates.

Shelves and Hooks

There should be two shelves running the entire length of the front side of the dark-room above the tables *a* and *c* and the sink *b*. The first one should be four inches wide, and should be 28 to 30 inches above the working tables. This will probably come above the window also, and will be out of the way of the photographer's head and such other light apparatus as he may wish to have with him in developing plates. The second shelf should be 10 inches above the first and should be 6 inches wide. This will receive larger bottles and jars, such as are not needed very frequently. The shelf previously mentioned is primarily for bottles containing developing solutions. On this shelf we will naturally keep the bottle of 10 per cent potassium bromide, and perhaps the reducing and intensifying solutions. The space underneath the shelves and sink, *a*, *c* and *b*, cannot all be utilized at once. The photographer has to store his feet under *c* during development, but under *a* and *b* he can have a large box for wastes. A certain number of plates and a good many fond hopes go into that box.

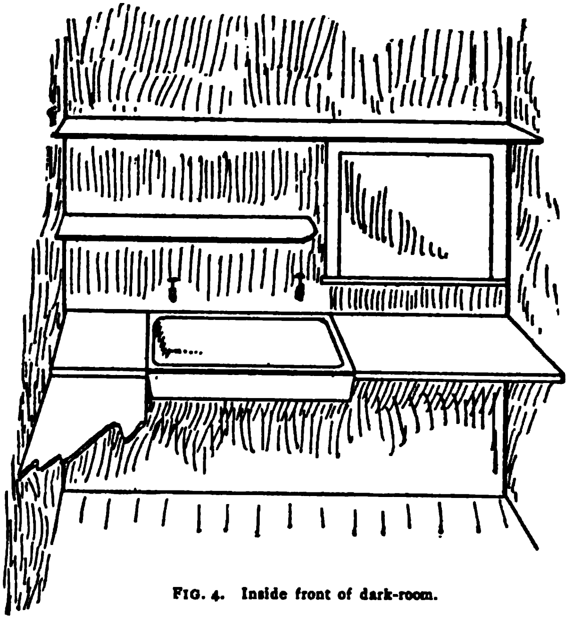


FIG. 4. Inside front of dark-room.

Under *g* I would put a rack for trays. Each worker will probably make such a rack in the way his own ingenuity suggests, but perhaps the best way is to arrange a series of divisions into which trays can be slipped and where they will stand on edge. From such a shelf they can be withdrawn easily. Any tray can be taken out in a moment without tumbling over half a dozen others. There will be two or three shelves over *g*, too. On these I would keep my glassware and smaller tools, graduates, beakers, stirring-rods, brushes, etc.

Under the shelf *k* we may find convenient storage for larger boxes, bottles and jars of chemicals which we may desire to keep in quantities. When we buy hypo a hundred pounds at a time, and carbonate of soda in 25-pound lots, we can soon use up a considerable amount of such storage space. There should be three shelves over this table, *k*, too, running the whole length of the room. It is not necessary to specify just what shall be kept on these shelves. There are always things enough, and we will seldom have more shelf room than we need.

Besides this seemingly extravagant amount of shelving already specified, I would have one more, which would be a large bracket corner shelf in the angle over *a*, where the two upper shelves join. This shelf should be about a foot square and is to hold a bottle of 5 to 10 litres' capacity. (One holding 32 to 64 *quarts* might do.) This bottle is fitted with a siphon and a rubber discharge pipe, the latter tipped with a glass nipple, the whole constituting the distilled water fountain, Fig. 5. By means of a good pinch-cock on the rubber tube we can draw out what water we may need easily and accurately, and can always have it handy without its being in the way.

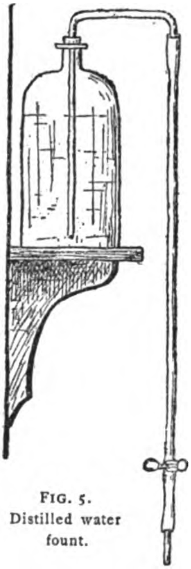


FIG. 5.
Distilled water fount.

Besides that, we do not contaminate the distilled water supply by now and again uncorking the bottle.

The Vestibule

Here we have one of the most important adjuncts of the dark-room. It should never be omitted from any plan, except on the most imperative necessity, and may be regarded as practically indispensable to the permanent working photographic plant. The one shown in the accompanying plan at *B* is merely large enough to afford ingress and egress for the photographer who uses the room beyond it, but there is still space at the back, at *m*, for a cupboard. In this cupboard one will naturally keep his stock of plates, and perhaps also his collection of negatives. In this cupboard I prefer to keep my stock of small chemicals, like pyro, tolidol, metol, adurol, glycin, rodinal, and the dozen other developers that I like to have around, uranium nitrate, potassium ferricyanide, and neutral potassium oxalate. A closet like this may just as well be made as large as the room allows. It may seem a great waste of space at first, but before a year of active work is ended there will be an accumulation of chattels that would make an old colonial garret look as tidy as the pilot house on a new yacht.

Some Variations

We have now finished, at considerable length, the description of one dark-room. While the plan presented is believed to be in every way practical and to offer a convenient working scheme for the construction of an ideal photographic work-room, yet the writer and the reader will both see that many changes are apt to be required in adapting this plan to varying conditions. Sometimes a very slight alteration will make this scheme fit into a special case, or will change it to suit the taste of some one who has useful opinions of his own. Let all such changes be made without hesitation. This plan is not so delicately adjusted that it will break all to pieces the moment any part is moved.

Perhaps one of the first changes will be in the size and disposition of the vestibule. If one is situated so as to have the "labyrinth door"—I don't know what else to call it—described on page 401, the vestibule may be easily dispensed with. Sometimes, on the other hand, the vestibule may be enlarged to advantage. If one has a growing collection of negatives to care for, and if this seems the best place for storing them, then the space ought to be large enough at least to offer room for a cabinet or a row of shelves along the whole side. In other cases the vestibule may be used as a general work-room, in place of the one described further along.

Other changes in the arrangement of tables, sinks and shelves will suggest themselves to anyone who looks carefully into his own requirements and the best means of meeting them. The change which seems to me most promising of good results for careful workers is the addition of more sink room. This may be given by making the one sink longer; but it is better to have a second sink added. It is a real convenience many times to have two sinks, particularly if one is occupied with the wash-box, as has been already suggested. Some photographers are in the habit of developing in the sink, but this is a slovenly habit, and one to be severely frowned on by all good photographers.

More Work Room

Whatever may be the arrangement of the dark-room and vestibule, it is very desirable to have still another work-room. In a large establishment, of course, there is a "studio," a dark-room, a store-room, a printing-room, a work-room, and perhaps many other convenient spaces; but even the mildest amateur needs a place for making up his solutions. If we have to weigh out dry pyro, or to make up Cramer's formula for a chrome alum fixing bath, we need room to work. The cramped and ill-lighted quarters of the dark-room proper are highly insufficient. We are practically obliged to have a place where water may be heated, for many photographic solutions have to be made up in hot water. If we can have even a small table outside the dark-room with a gas stove on it and room for a balance and a few other things, then we will be equipped for work. If we can have a good laboratory table, a separate table or stand for weighing and measuring, and a good sink, all fitted with gas and water, there is very little left to wish for.

Curtailing Ambitions

After we have decided on our quarters, and after the question of the water supply has been settled, then we will usually have to proceed by the method of seeing what we can get along without. It is a question of what can be spared. Something has to be sacrificed. If we take for our point of departure the plan already studied, Fig. 3, we will probably decide that some of the main shelves can be spared first. Perhaps at a pinch we can get along with a single shelf, say the one marked *c*. On this we can set the developing tray; and if we are always careful to see that it is dry, we can use this shelf also for changing plates. The sink will have to be sacrificed, of course, if the plumbing is not made to reach into the little dark-room, and that simplifies matters again. The shelving above and below the work tables can be cut down in quantity and rearranged to suit the space at command, and, as far as possible, to meet the needs of the worker. The vestibule may have to go; but if the hall or room off which the closet opens can be thoroughly darkened it will serve as a considerable protection in place of the vestibule. It is a good plan, in a room of this sort where difficulty is experienced in making the door safe, to hang a heavy blanket over the door either inside or outside. If we have an accomplice on whom we can depend, the outside arrangement is better. If not, the blanket had better be hung inside where we can tuck it up for ourselves after we are safely locked in. A door is especially apt to admit light at the bottom. This needs to be watched, and perhaps a heavy rug or some piece of quilt or blanket may be laid over the crack after the door is shut.

The Home-made Dark-room

Many enthusiastic amateurs will find the foregoing modest plans too elaborate for them—too expensive of space and time and money. There are hundreds of photographers who want a place for development and for the other common operations of the dark-room, but who can not go into the business so deeply. They try to be content with the opportunities offered by a made-over closet, or by a little room in the basement. Perhaps the basement is the most common refuge of the amateur photographer who has to do his work at home without elaborate facilities. The building of such a room, under such conditions, offers a series of problems entirely different from those we have already examined.

Available Places

The basement offers the advantage of being darker than other parts of the house. It is easier there to make a dark-room safe. Furthermore the space is less valuable than on the upper floors of the house; and that is often the determining argument. There is apt to be not another nook or corner in the house which the family will give up for the photographer's sole use. The camera man is looked on as a sort of a nuisance at best, and merely to be tolerated. It would be absurd to turn over to him such a valuable asset as the shoe closet or the clothes press at the end of the hall. Still, if the photographer has influence enough in the family, and will take my advice, he will go to the basement only as a last resort. Let him stand up for his rights. Claim the best closet in the house, and stick to it. The basement dark-room is very hard to heat, and is always apt to be damp and mouldy. It is a bad place to work, a bad place to keep plates, a bad place for deliquescent chemicals, and a genuine damper on a man's ambition all around. Can you imagine Alma-Tadema or Sargent going down cellar to paint "A Reading from Homer" or the "Frieze of the Prophets"? The most practicable place about the house is doubtless some closet, preferably a hall closet on an upper floor; but the whole choice of a location for the dark-room is a domestic, not a photographic question.

The Water Supply

Doubtless one of the prime reasons why the basement is a favorite resort for the amateur who wants to build a dark-room is that the water supply may be easily reached there. If the water-pipes pass up to the floors above in the corner of the basement, as they commonly do, the dark-room may be conveniently located in that angle, two sides may be saved in the building and the water-pipes may be tapped right where they stand. In other cases the dark-room takes advantage of its proximity to the laundry in the basement. The plumbing of the laundry furnishes a chance to get at the water, or, at least, an opportunity to get rid of the waste. In a closet dark-room it is almost out of the question to have any plumbing. The water supply and the water waste must be provided for in some other way. Practically this usually means that the supply is very closely limited. In the majority of cases the contriving photographer is forced to employ some of the "substitutes for plumbing" described in an earlier paragraph.

A Basement Dark-Room

One can get plenty of advice on making a basement dark-room. The photographic journals have always been freely sprinkled with articles on "How I Did It." The *Photo-Beacon* about a year ago had a prize series of articles on the subject. This competition called out a number of excellent schemes, one of the simplest and most original of which is illustrated herewith (Fig. 6). In this case the water-pipes already passed through the basement, coming up in one corner. This corner was selected for the dark-room, and all that was necessary in the way of plumbing was to put in the tap and to

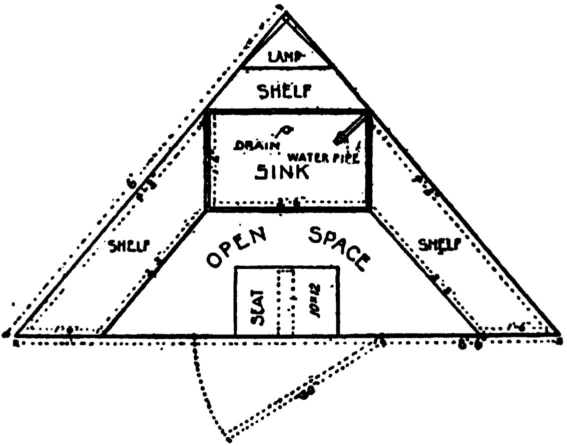


FIG. 6. Plan of basement dark-room.

provide a waste way. The light is furnished by putting a lamp directly in the corner of the room.

Temporary Quarters

There is still a lower stage to which our photographic ambitions may drop when necessity dictates. We can do a good deal of film and dry-plate work without any regular dark-room at all. Our quarters may be dark-room tonight and laundry tomorrow morning, or they may be dark-room at this moment and bath-room before bedtime. It is not so very difficult, when one has by practice mastered the details of the inconvenience, to make a very reasonable temporary dark-room out of the laundry, the bath-room or the kitchen store-room. Lots of fun and some good pictures have come out of such places. The favorite rooms for this sort of business are doubtless the bath-room and the laundry, already mentioned, largely because they usually offer a ready supply of water. But any small room with few or no windows is capable of being turned to photographic uses. Mr. James H. McCorkle tells in an interesting way how he dispenses with the conventional dark-room altogether.

"When convenient, a dark-room is certainly desirable, and I would very much like to possess one. But having never possessed such a convenience, and having obtained very satisfactory results without it, I must emphatically express the opinion that a dark-room is not a necessity in amateur photography.

"It is some years since I took up photography. Spending many months of the year in railroad travel, the camera seemed to offer a peculiarly attractive hobby, as well as a means of getting bits of life here and there. In all these years I have developed many negatives, more than half of them being developed while traveling on the road. Given the average hotel room and running water, I find myself able to develop my exposures with comfort and certainty. The room can generally be darkened sufficiently to permit the development of even such sensitive plates as Cramer's instantaneous isochromatics. The work, of course, is done at night, and I carry a little folding ruby lamp. If the room has electric lights in it, I cover a single bulb with two thicknesses of postoffice or deep orange tissue paper.

"Further than this, I may state that I rarely use a tray in the development of my negatives, even when working plates 6½ x 8½. I have a glass containing my developer, and another containing a strong solution of hypo soda, with a tuft of absorbent cotton in each solution. Using the cotton as a swab, I first wet my plate evenly with water, apply the developer with the swab, wash it when development is completed, and 'fix' or clear the image by applying the hypo solution with the swab of cotton. With a very little care and practice this will give negatives just as clear and brilliant as can be had in a tray; moreover, the method certainly gives more control over the negatives (for local modification) than is possible when immersed in the solution.

"My negatives give me good prints, the method of development apparently making no difference in result. At all events more than one critical editor, including the editor of THE PHOTO-MINIATURE, has expressed pleasure in the pictures produced in this way. Its plain advantage is that it enables me to pursue my hobby wherever I find myself or my subject—which would not be possible if the conventional dark-room was a necessity to the finishing of the negative."

Windows and Doors

Windows are the chief trouble in the management of any room for temporary quarters. When a considerable amount of work is to be done and the room to be frequently changed back and forth between its two uses, it may be best to provide some special coverings for them. This can be accomplished by having light frames made to fit each window, and covered with any opaque material. Two or three thicknesses of heavy black cloth, or of black building paper will answer very well. Such a window blind may have a small ruby pane fitted into it if the room is to be used day-times, and the filtered sunlight may be used to work by. Generally it is best to depend on a dark-room lantern, however, in cases like this. The most ready, convenient and efficient blind for a window consists of a heavy woollen blanket.

This usually has to be fastened to the top of the window casing with thumb tacks or with carpet tacks. Frequently a certain number of similar tacks are required along the sides of the casing, and at the junction with the window sill, to keep the curtain firmly closed. When this sort of hanging has to be put up frequently it will probably be found best to sew rings on to the curtain and to put up some small hooks at corresponding points around the window so that the whole affair may be hooked on or pulled off quickly and easily and without marring the window casings. The door usually has to be treated in the same way, that is by hanging a suitable blanket over it and by placing a rug at the bottom where the light comes in over the threshold. After one gets used to it, as we have said, by practice, all these arrangements can be made and unmade very quickly and without much trouble.

Portable Furniture

In the ordinary dark-room all the furniture, or nearly all of it, is permanently attached to the structure. The sink, the shelves, the tables and the storage closets are fastened where they are to stay. It usually happens, however, in the management of the temporary dark-room, such as we have been describing, that the whole set of apparatus must be portable. We must be able to shut it up, pack it away, put it out of sight. Doubtless the most convenient shift is to employ some sort of folding cabinet. A stock form which is commonly obtainable from supply dealers in England is shown in Fig. 7. No similar cabinet seems to have been put on the market in this country. Perhaps it would be worth while for some enterprising Yankee manufacturer to introduce something of this sort, not too elaborate in its construction and not too exclusive as to price. Many times the photographer can secure the help of a handy carpenter to make some sort of cabinet to suit his purposes. The sketch offered in Fig. 8 is merely a suggestion. It shows a small table and cabinet somewhat in the form of a folding sewing machine. The little sink in the top is merely an iron bread pan set into the frame. It can be taken out and washed when desired. The whole affair closes its doors when the evening's work is done, and nearly all the photographic materials may be stowed away inside. Probably it is best to fasten the door with a lock and key, for some of the chemical salts used in photography are dangerous poisons to have around loose.

Whatever plan may be adopted, the user of a temporary dark-room will have to have some box or closet into which he can collect his bottles, packages and trays when the work ceases, and in which they can be kept safely till the next period of photographic activity. This matter must be looked after carefully.

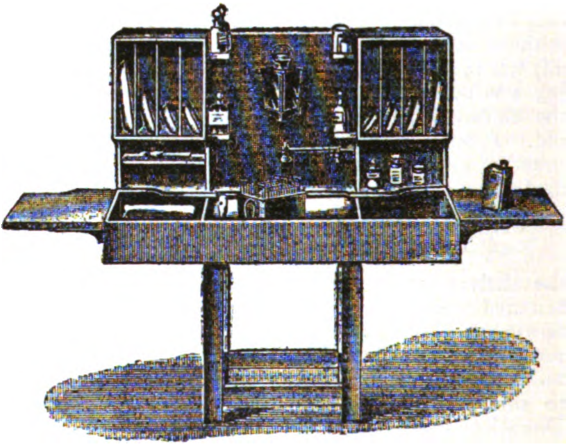


FIG. 7. Folding developing cabinet.

Portable Dark-Rooms

Various developing boxes or so-called portable dark-rooms are manufactured in this country and can be bought of the camera supply men. If one *must* carry a developing outfit into camp with him, if he feels absolutely obliged to develop his plates in the barren lands beyond the Saskatchewan or up at the timber line on Orizaba's slope, then, of course, some such apparatus is a necessity, though I hardly see how I could get any fun or satisfaction out of it. All such apparatus, when carefully used, is fairly safe and reliable. Its proper use must be peculiarly a part of each man's own ingenuity. The fur coat which one might conveniently wrap around his head during developments on his Nova Zembla trip would probably not be at hand when he explored the Orinoco.

Directions have often been given for the manufacture of "portable dark-rooms." A good many photographers doubtless are enjoying the inconveniences of the home-made article. Specific directions for making one need hardly be given, since this, too, is chiefly a question of each man's ingenuity. The general scheme is to arrange a small box without any cover, say 16 x 36 inches in size, and 16 inches deep. This is placed on one side, so that the open portion comes in front. There is a window in the back, provided with the usual ruby filter, opposite which a lamp may be placed when needful. The front of the box is then closed by a large curtain or tent of black felt cloth which fits light-tightly about the box edges. The free edges of this curtain are drawn up about the operator or are fastened about his waist with a draw-string when he introduces his

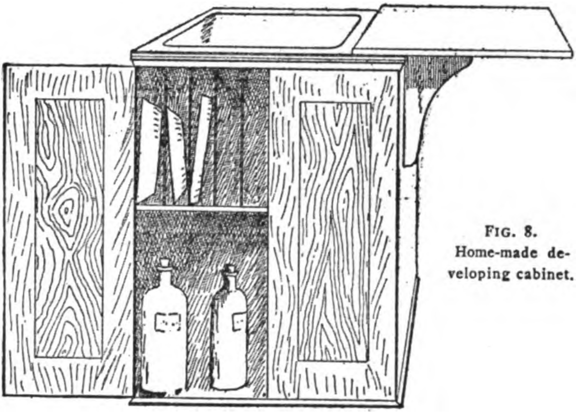


FIG. 8.
Home-made developing cabinet.

upper portions into the dark-box. The necessary water may be supplied through a rubber tube from a pail set on top of the box, and may be discharged similarly into another pail placed on the floor at one end. If even this simple apparatus seems too complicated for the rigorous circumstances, then a pail of water can be placed inside the box and the plates washed by dipping into this. A very light washing will do for the moment, and after the photographer has finished those operations which require darkness, the half-washed plates may be taken out and handled where water is plentier. If one is camping by the lake shore, for instance, he can take the plates down and wash them in the lake at his leisure. Working in this way, the photographer can get along with a remarkably small amount of plumbing and other apparatus. It is wonderful what one can do without when one has to.

"Custom-Made" Dark-Rooms

In Europe they do some things better than they do them in America, and this dark-room business is one of them. In the catalogue of an English dealer there are offered six different portable dark-rooms, four different "developing tents" and six different styles of changing bags. Nearly every one seems to be a practicable design. One of these folding dark-rooms, which furnishes a working-room of 6 ft. by 3 ft. 2 in. by 3 ft. 2 in., folds into a roll 6 ft. long and 4 x 6 in. around, and weighing 16 pounds. Another somewhat more elaborate folding dark-room furnishes a working space of 6 x 3 x 3 ft. when set up, and has a ruby light and two working-shelves to hold developing and fixing trays, etc. When packed it occupies a space of 6 x 9 x 36 in. and weighs about 20 pounds. The list price of this dark-room is £2 ($10). Such things might be quite as readily and probably more cheaply made in this country. If there ever seems to be a demand from our amateur photographers for such conveniences the manufacturers and dealers may be depended on to supply them.

Changing Plates

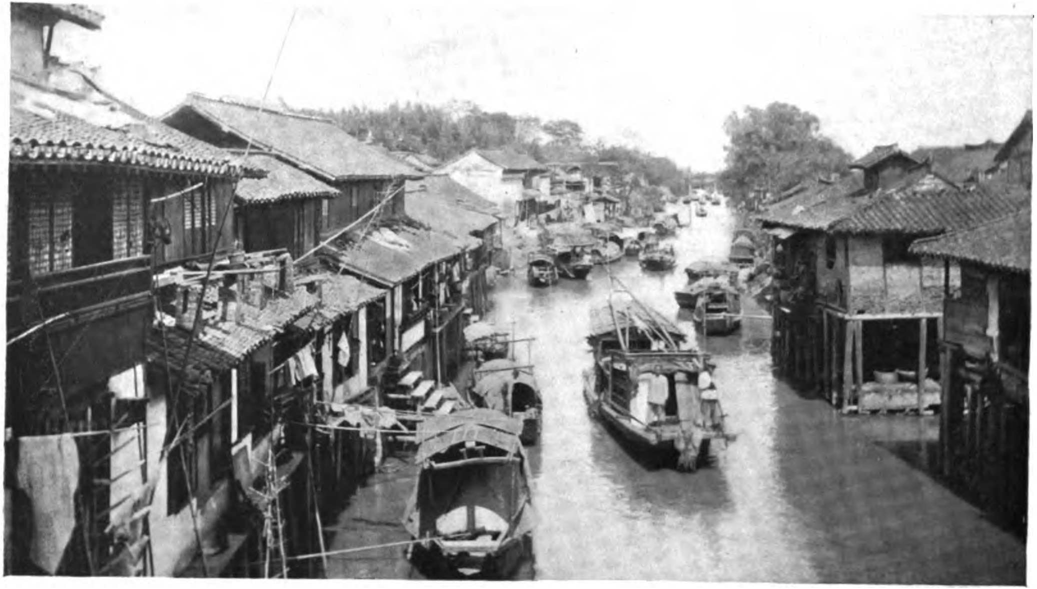
One of the greatest advantages which the film camera may claim over the plate camera is that with the new cartridge system the film camera may be reloaded anywhere. One who carries a camera away from home—as who does not?—finds a single instalment of plates much too small a supply for any considerable expedition. Either the cartridge system has to be adopted or the plates must be changed in the dark. Sometimes one can manage to keep within reach of the photographers' dark-rooms, but oftener not. Under ordinary circumstances I have found it fairly satisfactory to use a bedroom closet. Especially if the work is so ordered that we can use such a closet at night, there is no trouble at all connected with it. The room is closed, the blinds drawn, the lamp extinguished. We take the plate-holders and plates into the closet, close the door carefully, and the exchange follows without difficulty or danger—that is, providing always that we can handle plates promptly without a light. A ruby lantern can be introduced, but it complicates matters and should be kept out if possible. One should learn to tell the film side of a plate from the glass side at the first touch. It is very easy after one gets used to it. Then the matter of changing plates in the dark is very simple, indeed. All the manufacturers, so far as I know, pack their plates carefully and always in a given order, so that one does not need to depend on his sense of touch even to tell which side up a plate ought to enter the holder. If one uses a bedroom closet in the daytime more caution is required. It is a good plan to test the closet first. Go inside, shut the door and wait until the eyes get adjusted to the darkness. Soon you will see the places where the light creeps in, if there are any, and suitable steps can be taken to stop them. Hanging a heavy blanket outside or inside the door is an expedient of very general utility already mentioned. Placing a heavy rug at the bottom of the door, outside or inside, is another.

Changing Bags

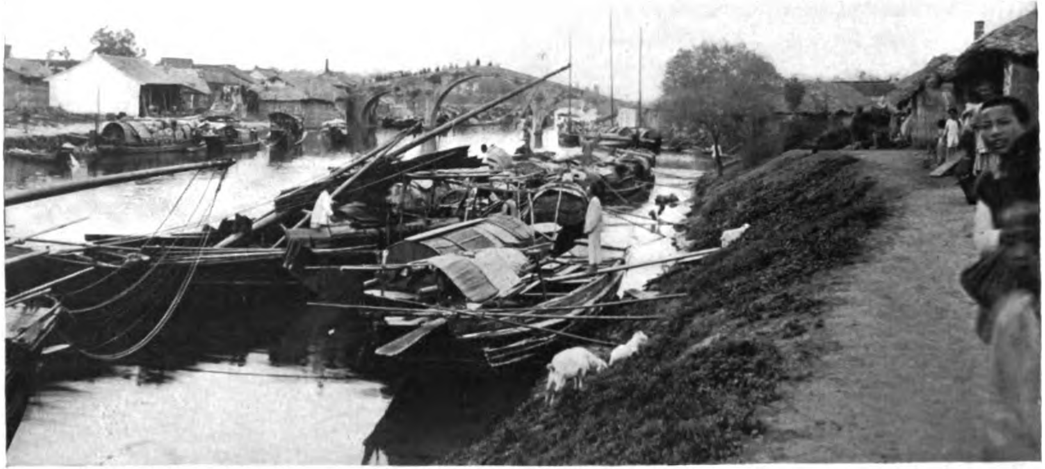
For one who does a great deal of traveling with a plate camera perhaps the changing bag is the safest companion. Then when the friendly dark-room and the bed-room closet both fail there is another safe resource. This piece of apparatus is simply a bag of dark, heavy cloth, which may be tied about the wrists or arms with draw-strings. One puts the plates inside with the plate-holders, thrusts in his hands, and depends on some accomplice to tie the bag about his wrists, or the openings are bound with heavy rubber bands. Using the simplest form of the changing bag, one depends entirely on the sense of touch for the transfer. Better bags have a small panel of ruby celluloid stitched into one side so that, at a pinch, one may get a glimpse of things. Still more elaborate bags have an opening for the eyes. This opening is through a block shaped to fit the face properly. The block is strapped over the head and holds the bag to the eyes without admitting any light. If, then, there is also the celluloid window in another part of the bag, to admit a little filtered light, the worker can go ahead and see what he is doing all the while just as well as though he were at home in his own dark-room with his own apron and slippers on. These changing bags may be bought of the larger dealers here and in England, or they may be home-made with entire success.

The Very Last Resort

It has not seldom happened that I have been caught away from home with my holders full of exposed plates, with everything crying out to be photographed, and with not even a bedroom closet within reach. Anyone who ever goes camping, hunting or fishing and takes along a camera is apt to meet such experiences. In such circumstances I have adopted an expedient which may be old with others (as it is with me), but which I have never seen described. We go into the sleeping quarters, stateroom, bedroom, tent, or whatever they may be, and darken everything as much as is possible. The night season is chosen if in any wise possible. We then examine the bed and the bedding. White sheets are discarded (usually), and dark woolen blankets or crazy patchwork quilts are substituted. After providing the bed amply with these we turn all the covers smoothly down as though about to retire. We then arrange the holders containing the exposed plates on the bed at the left, with an empty plate box on the right. After that the covers are turned smoothly back to position number one. Then the photographer, kneeling beside the bed in an attitude of fervent supplication, thrusts his de-



ON THE SOOCHOW CREEK, CHINA
J. R. Collaco



SOOCHOW CREEK: NEAR THE CITY OF SOOCHOW, CHINA

J. R. Collaco

voted head and shoulders beneath the blankets, draws the covers firmly under his armpits, and proceeds to business. The thing may not appear dignified, but it is effective and legitimate. If some friendly hand will throw an extra blanket over the workman's back after he has insinuated himself into the bed coverings, the whole transaction becomes perfectly easy and safe, from the photographic standpoint. It is usually best to take the exposed plates out of the holders at one operation, placing them in an extra box which must be provided. Then we can turn the covers down again, put away the box of exposed plates, rearrange the holders and the slides, place a box of fresh plates at hand, and refill the holders with fresh, unexposed plates.

Furnishing the Dark-Room

The satisfaction which we get out of a dark-room is dependent only in part on the room itself and its grosser appointments. It comes almost as much from the furnishings. It may be worth while, therefore, to devote a few words here to the things which go into the photographic plant after the room itself has been provided. These furnishings will naturally vary to a considerable degree with the kind of work to be done, the style of camera used, and the taste and extravagance of the photographer himself. Still the main requirements are so uniform that we may well be a trifle specific in speaking of them.

To begin with, let us suppose we are furnishing a dark-room for the use of a worker who employs a 5 x 7 plate camera and who does a moderate amount of work. The things which he will need are about as follows: 2 trays, 5 x 7; 1 fixing bath for 5 x 7 or 5 x 8 plates; 1 wash-box, 5 x 7 size; 2 negative drying-racks; a supply of bottles; 1 8-oz. graduate and 1 1-oz. graduate callibrated in minims; a half-dozen beakers, 4-oz. and 8-oz.; 1 large soft flat brush for dusting plates. For the work-room where solutions are made up there will be required 1 balance; 1 stew-pan or casserole holding about 64 oz.; 2 or 3 stirring rods, and a gas stove or some other means of heating water.

These specifications may be looked on as representing almost the minimum requirements. Experience will lead to the purchase of more utensils rather than to the abandonment of any of those named. Some of these things are of so much interest that they will bear a word or two more.

Trays—All Sorts

For instance there is the matter of trays. Always get deep trays. I can not see the use of a shallow one. Perhaps there are purposes to which they are suited, and perhaps there are workers who are warmly in love with shallow trays, but for myself I find them a nuisance. I think they are oftenest used for development—a business for which they are especially unsuited. One should always use an abundance of developer and should keep it distributed over the plate by frequent rockings. With this treatment the shallow tray habitually slops over. No, let us say we will have good deep trays. Also let us have enough of them. I have just looked into my dark-room and find there an even dozen, only one of which I could spare. That is a little, shallow 4 x 5 which a friend left here by mistake; and even that is frequently called into requisition. Trays come handy for such a variety of things that one can afford to have a decent supply. Probably the hard rubber trays are best, all things considered, though all the others are good. Heavy papier maché trays are cheap and fairly durable. Porcelain trays are easy to keep clean and I like them very much. Glass trays are good for a variety of uses, though always subject to breakage. I find it most convenient to have some of each kind, and to use certain trays for certain purposes. Developers go only into hard rubber trays; hypo solutions only into glass.

Perhaps it is worth while to mention the rocking-tray. This is made with the rockers directly attached to the tray, or else a pair of rockers are furnished separately which may be attached to any tray of a given size. This makes it easier to rock the tray during development and so to secure an even distribution of the developer and a negative unmarred by air bubbles. I have always managed to get along without one. Perhaps I would be more enthusiastic over the scheme if I had tried it. Automatic rocking devices are obtainable from dealers, or may be seen, fully described, in some of the earlier annuals. The modern system of tank development for uncertain exposures now seems to have put rockers far behind the times.

Fixing Baths

Negatives may be fixed while lying flat in any ordinary tray, but it is much better to use a fixing bath in which the plates stand on edge. A good fixing bath of this sort has some space at the bottom below the little shoulder on which the plates rest; and into this space the sediment of the fixing bath gathers. There is almost always some precipitate in a fixing bath, especially in a good strong acid bath; and this is apt to stain the negatives unless it is allowed to settle out of the way. In a properly constructed bath the supernatant liquid is always kept clean and clear; and if a good formula is used, like Cramer's or Carbutt's chrome alum bath, for example, the fixing solution may be kept unchanged for a month or two, even with frequent use.

The Wash Box

Negatives may be washed in any ordinary tray, just as they may be fixed in one. In fact some photographers are reputed to develop, fix and wash their plates in the same tray. That sort of work is not to be recommended, though. A good zinc wash box for ordinary sizes up to 5 x 7, costs a dollar or two, and is by far the best thing to use. For washing roll films a deep bowl serves as well as anything I know of; or the revolving drum introduced for this purpose is completely effective if attached to power of some sort to ensure continual motion.

Graduates and Beakers

The best graduate is one sold by the chemical companies, and seldom seen in photographic supply catalogues. It has no awkward neck at the bottom, raising the center of gravity to the tipping-over point. It has no glass foot to be broken off. It is a plain flat-bottomed glass vessel, much the shape of a flat-bottomed beer glass. This is hard to upset, and even when it is knocked over it seldom breaks. Of course it would not do to let pass this opportunity of saying again that the only reasonable graduate is callibrated in cubic centimeters. Any man who has the intelligence necessary to learn to read can learn the metric measures in 20 minutes, and it will save him hours of worry thereafter. The dark-room should be supplied with at least two graduates, one large one and a small one; and if there are four or five of different sizes they will not come amiss.

It is customary to measure the developing solutions in the graduate, then to place this vessel on the developing shelf, and finally to pour the solution from the graduate over the plate. When development is finished the solution is poured off; presently it is poured back over another plate; and this manœuvre is repeated ten or fifty times a day. During all this work, carried on in the dark, the graduate is in constant danger. It is much better to pour the developing solution, as soon as it is measured, out into some lighter, flatter, cheaper vessel. Nothing is better for this than the lipped glass beakers of the chemist, to be had in all sizes from all chemical supply houses. In lieu of them one may use large table glasses. Those with large capacity and comparatively straight sides—technically known as "schooners"—are best. Sometimes one can pick up a porcelain or agate ware cup of suitable shape and capacity, and then one has an unbreakable substitute for the graduate.

In re Bottles

One is often advised to select a miscellaneous assortment of bottles for the dark-room, choosing the most diverse shapes and sizes possible. The excuse for this is that one soon learns to know his bottles by their shapes, and can pick out the 10 per cent. potassium bromide or the 40 per cent. sodium carbonate in the dark. Those who feel the force of this advice had better follow it. As for me, I do just the opposite. Only recently I threw away every bottle on the whole photographic preserve and stocked the premises with an entirely new lot of uniform amber bottles. My reason is this: I want the dark-room to look as clean and neat as possible. It is too bad to make a dark-room look like a junk shop, and a crazy-patchwork of old bottles is not an inspiring sight, even by the dim red light, where one's photographic inspirations grow. The most generally convenient bottle for ordinary solutions seems to be the one-pound square amber bottle with narrow neck. This holds 500 cubic centimeters, so that of the common two-solution developer one makes up just a litre at a time—the most convenient quantity. For certain solutions, like hypo, soda stock, etc., larger bottles are needed. Large acid bottles, or those commercially known as "seltzers or packing bottles," are to be specially recommended for such purposes.

In the Laboratory

For the adjacent work-room, or for that part of the dark-room where solutions are made up, one needs first some sort of stove. A small gas stove is most convenient, other things being equal; but, as it seldom happens that other things are really equal, each photographer must furnish himself with that form which best fits into his circumstances. Next one needs a balance. It had better be a good one. (Of course it should be a metric balance, weighing in grams, to be right.) A fairly good balance can be bought for about $2, and a really good one for $3. Substitutes can be had much cheaper. For making up solutions one needs a large deep stew-pan, or something of the kind. This should hold about a liter, or say a quart. It may be larger, but it ought not to be smaller than that. A good granite-ware or agate-ware pan serves first rate; and two are better than one. The one thing which is better is a porcelain casserole, which may be bought of the chemists for about $1.25. This casserole is really very much worth having.

A Word of Caution

We have now described as simply and with as much detail as possible how to make a dark-room. We have considered as closely as we could the different circumstances under which such a piece of work is likely to be undertaken. This account has been drawn from the rather wide and varied experience of the writer, amply assisted by the suggestions of several friendly photographers, and by the extensive discussions of this and related subjects in photographic books and journals. Nevertheless it cannot be hoped that the plans here outlined and the suggestions here made can be adopted *en bloc* by anyone. Every worker who aspires to own a dark-room must have some ingenuity for himself. He must be able to make such modifications in the plans as his needs may demand or his fancy inspire.

The building of a perfectly satisfactory dark-room is largely a matter of experience. After one has worked in a dozen different rooms, some good and others bad, he learns to know what is necessary and what accessory, what is handy and what bothersome, what is comfortable and what disquieting in the construction and appointments of a photographer's den. Moreover it is necessary for the photographer himself to pass through several metamorphoses before he comes to the full stature of his own ideas. He must have his spell of testing different brands of plates, he must have a season of experiment with the various developers, and out of these trials he must settle on some more stable photographic habits before any dark-room can possibly be constructed to satisfy him. "Let every man be fully persuaded in his own mind," the Apostle wrote, and though he was not speaking of photography his counsel is apt for present application. F. A. WAUGH.

BOOKS

The Dark-Room and Its Appurtenances. By H. L. Masse. 33 pp. 1897. (English.) 25 cents.

Photographic Manipulations. Being No. 23 of THE PHOTO-MINIATURE series 1901. 25 cents.

The chapter on "Dark-Rooms" in Wilson's *Quarter Century in Photography* also gives full treatment of the subject. 526 pp. 1887. $4.00.

ANTI-TRUST

PURE
COLLODION
PAPERS

MONARCH MATTE

MONARCH

TRADE MARK

MONARCH GLACE

RELIABLE
UNIFORM
PERMANENT

Three times quicker printing than any other

Prices same as other Collodion Papers

MANUFACTURED ONLY BY THE

MONARCH PAPER COMPANY

E. & H. T. ANTHONY & CO.
SOLE TRADE AGENTS
122-124 Fifth Avenue : NEW YORK

ANTI-TRUST

Kindly mention THE PHOTO-MINIATURE

NOTES

In rounding-up our printers' bills for 1901 we find ourselves able to make the following report, which will interest our readers everywhere:

During 1901 there have been printed 118,448 copies of THE PHOTO-MINIATURE, an average of 9,870 copies per month during the year. Of this grand total 64,800 copies represent the regular editions of the magazine during 1901, the balance, 53,648 copies, representing the reprint editions of various numbers of the series. This is a good showing and surely deserves a place here.

◆

We have to thank the publishers of *The Photogram*, Ltd, London, for bound copies of *The Photogram* for the year 1901, a volume invaluable for reference; and *Photograms of the Year 1901*, the contents of which were noted in our last issue. Some day we hope to make up a few bound sets of THE PHOTO-MINIATURE, when we shall have opportunity to show practical appreciation of these expressions of good will.

◆

What promises to be a notable photographic competition has just been announced by the Eastman Kodak Company, Rochester, N; Y., under the title: "Kodak Progress Competition." The purpose of this competition is to demonstrate the progress made by the kodak in the field of photographic art. $4,000 are offered in prizes, $2,000 in cash, and $2,000 in kodaks. The contest opens January 1, and closes November 15, 1902.

According to the circular of information, obtainable on request from the Eastman Kodak Company, the terms of competition are few and simple. There are

CRAMER'S

Isochromatic

Plates

ARE THE MOST PERFECT COLOR-SENSITIVE PLATES ON THE MARKET

ASK YOUR DEALER FOR
REDUCED PRICES ON OUR ISOCHROMATIC PLATES

Made in Three Grades of Speed:

SLOW, MEDIUM and
INSTANTANEOUS

◆

For sale by all Dealers in Photographic Supplies

◆

Manufactured by

G. Cramer Dry Plate Co.

ST. LOUIS, MO.

OFFICES IN
NEW YORK, No. 32 East 10th Street
CHICAGO, Room 705, Cable Building
SAN FRANCISCO, Room 38, No. 819 Market Street

Kindly mention THE PHOTO-MINIATURE

eight classes, in some of which the first prize is $150 in gold; twenty-five awards are offered in each class; all competing prints to be made on papers made or sold by the Eastman Kodak Company, on Eastman's transparent film, exposed in a kodak or Brownie camera. The judges will be men well known in the photographic world, whose names will be announced at an early date.

We would urge upon the readers of THE PHOTO-MINIATURE that they should try early and often for the liberal awards offered in this competition. There is abundance of time for repeated effort, and for the careful selection of the best pictures readers may already have made with the kodak.

Although this competition is a matter of business with its originators, the Eastman Kodak Company deserves great praise for its enterprise, and for the encouragement of amateur photography which will result from its magnificent offer.

❧

Mr. John Carbutt, Wayne Junction, Philadelphia, has shown us some remarkable spectrum photographs obtained with his new *Polychromatic* plate. Readers interested in orthochromatic work (and who is not?) should acquaint themselves with the qualities of this *Polychromatic* plate which seems to abundantly justify its name.

❧

Abney's well-known *Treatise on Photography*, revised to date and considerably enlarged, has reached its tenth edition. As a general text-book of the theory of photography the work is one we can recommend to the advanced student. 425 pp., illustrated, $1.75.

❧

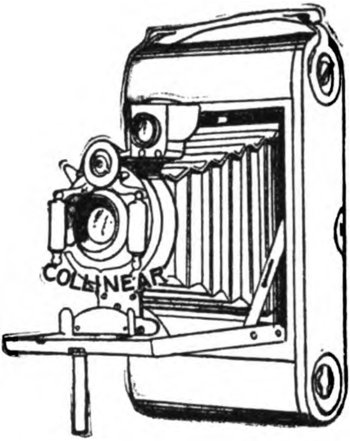
Penrose's Process Year Book for 1901 comes to our table later than usual, but is none the less welcome. It is a huge volume, measuring 7½×10×1 inch, containing a store of interesting information for process workers, illustrators and designers, and a comprehen-

THE COLLINEAR

SERIES II. F 5/6

can now be fitted to the

POCKET FOLDING KODAK No. 3



No. 3 Pocket Folding Kodak, with **COLLINEAR II, No. 2** and Unicum Shutter . . . $62.00.

COLLINEAR LENS and Shutter only . . . $48.00.

COLLINEAR, Series III, fits

	LENS AND SHUTTER
No. 2 Folding Pocket Kodak	$38.00
No. 3 " " "	$38.00
	LENS
No. 3 Cartridge Kodak	$40.00
No. 4 " "	$40.00
No. 5 " "	$50.00

A COLLINEAR, Series III
doubles the speed of your Kodak
COLLINEAR, Series II
quadruples it.

Sold by all dealers at uniform prices. For descriptive circular C, write to

VOIGTLAENDER & SON OPTICAL CO.
137 West 23d Street : New York

sive display of examples by modern methods of reproduction.

To be specific, the volume offers carefully prepared papers on: A Diffraction Spectroscope Camera; American and European Process Notes; A New Modification of Woodburytype; Automatic Adjustment of the Half-Tone Screen; A Wonderful Process; Collotype; Collotype as a Hobby for Amateurs; Color Curves and Pigments; Color Originals for Line Work; Copy for Reproduction; Developing Color-Sensitive Plates; Direct Three-Color Screen Negatives with Eos Emulsion; English and American Electrotypers; Experience, or Superstition? Focusing with the Modern Anastigmat; Forewords; Half-Tone without a Camera; How Many Dots? Importance of Accurate Type-High Blocks; Japan and its Color Prints; Light-Hardened Gum Solution in Surface Printing from Metal Plates; Magnesium Flashlight; Maxwell—the Master Man; On Fine Etching; On Retouching; Photographic Processes used in Book Illustrations; Photographing Interiors with an Extraordinarily Wide Angle of View; Photo-Lithography in Half-Tone; Process Work and the Lantern; Process Work at the Antipodes; Process Work in Hot Climates; Process Work in the United States; Some Notes about Three-Color Work with Collodion Emulsion; Some Reflections on Half-Tone in Grain; Stripping Collodion Emulsion Films; Testing Screens for Three-Color Work; The Aerograph in Lithography; The Half-Tone Process for Machinery Catalogues; The "Johnstonia" Mechanical Engraving Process; The Progress of Three-Color Printing; The Reproduction of Half-Tone Blocks by the Electrotype Process; The Silver Bath; The Three-Color Printing Process; The Three-Color Process; Trade Prospects in Australia; True and False Lamp Blacks; Uniformity in Negative Making; Why Coated Paper for Half-Tone Printing.

The illustrations comprise 36 supplements in colors; 79 full-page supplements by half-tone, grain, line, and other methods; 87 illustrations in the text and a photogravure portrait of Sara Bernhardt as frontispiece.

The book is published in London by A. W. Penrose

EXPERTS

who have tried our Landscape and Portrait Orthochromatic plates pronounce them equal in quality to the old-time "wet plates." No higher praise can be given a dry plate—
They are also just right for the rendering of correct color values.
Order of your dealer, or write us and we will see that you are supplied.

M. A. SEED DRY PLATE CO.
ST. LOUIS, MO.: 2005 LUCAS PLACE
NEW YORK, N. Y.: 57 EAST 9TH STREET

Kindly mention THE PHOTO-MINIATURE.

& Co., Farringdon Road; in America, by Tennant and Ward, New York. Price, $1.50, postpaid.

❧

Penrose & Co., Farringdon Road, London, have issued a new price-list which should be seen by those engaged in reproduction methods.

❧

An exhibition of Rotograph bromide prints, including the prize pictures of the recent Rotograph competition, is announced to be held at the Camera Club, 3 West 29th street, New York, January 2 to 16, inclusive. The exhibition is open to all interested, and the display will be one well worthy of a leisurely inspection.

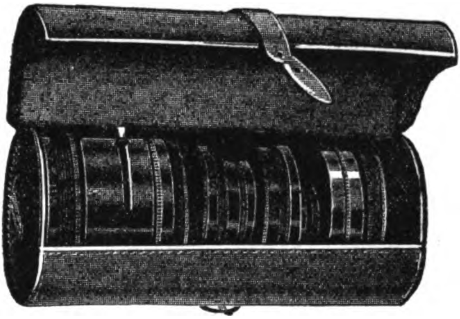
❧

We have had many inquiries for the address of the manufacturer of the Thayer Flash Lamp mentioned in THE PHOTO-MINIATURE No. 29: *Flashlight Photography*. This lamp, as we have but recently learned for our own information, is manufactured and sold by N. C. Thayer, 185 Dearborn street, Chicago, from whom descriptive circulars may be had on application.

❧

Freak photography, says the editor of *Photography*, will always have a fascination for some workers. The camera enjoys so excellent a reputation for truthfulness, and can so easily be made to lie, that the temptation for some of those who play with it to show off its capabilities in this direction is too great to be resisted. One of the commonest of the ways in which this is done is by means of "doubles," which in skilful hands may be "triples," or even "quadruples," or more. Doubles are photographs in which one person is portrayed in two positions, as, for instance, a man playing cards or chess with himself as his opponent. In order to take such photographs, the simplest plan is to make a box with two folding or sliding doors at one end, and just large enough to fit the camera front comfortably at

ROSS' LENSES



The Most Perfect Lenses in Light and Elegant English Mounts

ROSS' SYMMETRIC ANASTIGMATS
ZEISS' PLANAR AND UNAR LENSES
ZEISS' CONVERTIBLE PROTARS
GOERZ'S DOUBLE ANASTIGMATS
REVERSING PRISMS, MIRRORS
INSTANTANEOUS SHUTTERS, Etc.
HAND AND STAND CAMERAS
SCIENCE AND ENLARGING LANTERNS, Etc.

Catalogues Free

Awarded the GRAND PRIX, Paris, 1900

ALSO TELESCOPES, FIELD GLASSES, ETC.

Sold by Leading Dealers Everywhere

ROSS, LTD., MANUFACTURING OPTICIANS
Contractors to H. M. Government
111 New Bond Street, LONDON, W., ENGLAND

Kindly mention THE PHOTO-MINIATURE

the other. The exact distance at which these doors should be placed in front of the camera depends on the focus of the lens. It should be such that the image of one door, when the other is opened, comes exactly in the center of the plate. A few trials will determine the correct distance. The subject is then posed at one side of the table, and the door on that side opened, and an exposure made. The sitter is then changed to the other side of the table, the first door closed, the second opened, and another exposure made. [A still simpler plan is to use a "Duplicating Device," of which the market offers several varieties. — Editor P.-M.] A model with rather pronounced features must be chosen if success is desired, as there should be no doubt as to the two persons shown in the picture being one and the same. Ghosts are simply undertimed images of a white-draped model, through which the furniture, walls, and the like may be more or less distinctly seen. They are most easily obtained under conditions demanding a fairly long exposure. A small stop and an interior are generally employed. The person taking the part of the ghost remains in one position for a few seconds during the exposure, which lasts much longer. If several ghosts are desired, the same model moves quickly from point to point, remaining stationary at each one long enough to impress a faint image upon the plate.

◆

We regret to hear that Mr. E. J. Wall, whose writings on photography are well known the world over, recently met with a very severe accident, and is confined in a London hospital. With his friends in England and elsewhere we trust that Mr. Wall will speedily recover his accustomed health and alertness.

◆

According to that good friend of THE PHOTO-MINIATURE, Mr. George Ewing, of Calcutta, this magazine is stocked in India by Babajee Sakharam & Co., Esuf Buildings, Bombay. We may as well mention here that Dawbarn & Ward, Ltd., London, have the exclu-

J. Hauff's Ready Tubes

SAVE MONEY, TIME AND TROUBLE

ORTOL TUBES Sample Set, 35c

A two-solution developer for plates, papers and films

PYROL TUBES Sample Set, 25c

The best two-solution pyrogallic acid developer

J. HAUFF'S PATENTED DEVELOPERS

Metol : Ortol : Adurol : Glycin : Pyrol

BE SURE TO USE

GG Chemically Pure Sodas

Can you afford to take any chances with expensive and difficult exposures? No, you require the purest chemicals. Washing soda and inferior sulphites will not make a proper developer. Take no chances, but use

GG CARBONATE OF SODIUM ANHYD. CP, 1-LB. BOTTLE, 25c
GG SULPHITE OF SODIUM ANHYD. CP, 1-LB. BOTTLE, 30c
GG CARBONATE OF POTASSIUM ANHYD. CP, 1-LB. BOTTLE, 35c

ALL ARE DOUBLE STRENGTH

STEVENS . . .
PRINT TRIMMER

Special Features

Swinging knife, which insures constant contact and clean clear edges.

Transparent guide sheet to bring edges parallel to any of the lines in picture.

8½-INCH KNIFE, $3.00

NEW CATALOGUE JUST OUT

Copy for 10c in stamps

G. GENNERT 24 and 26 East 13th St.
NEW YORK

Kindly mention THE PHOTO-MINIATURE

sive trade agency for the sale of THE PHOTO-MINIATURE in Great Britain and British Colonies, with the exception of Canada. Readers of the magazine residing in any British Colony (excepting Canada) can always obtain THE PHOTO-MINIATURE by directing their dealers or news agents to Dawbarn & Ward, Ltd.

❧

A method for the preparation of "Sepia Platinum Paper for Cold Development," by A. Von Hubl, is translated in Anthony's *Photographic Bulletin* for January, which reaches us as we close this issue for press.

❧

We would like every reader of THE PHOTO-MINIATURE to see the prospectus for 1902, issued by the *Photo-Beacon*, of Chicago. Some unusually interesting features are promised therein, and we can recommend the *Photo-Beacon* as an investment of the first class.

❧

The Weekly Press, of Christ Church, New Zealand, is a newspaper of which that go-ahead colony should be proud indeed. The Christmas number, just received, is a wonderful piece of work from cover to cover, and fairly eclipses the American and British special issues we have thus far seen. The cover, 12x18½ inches, reproduces in tastefully harmonized colors, a portrait of the famous Maori beauty, "Kia Ora." A two-page supplement reproduces Werner's picture of "The Harvester," the lithograph being notable for its freedom from the coarseness and vulgarity of coloring often seen in work of this class.

The contents of this special issue lead off with a story by Stephen Crane, and include stories by Cutcliffe Hyne and other well-known writers. But the glory of the number is its wealth of half-tone illustrations, of which there are more than 150, some of them of unusual size, and all of good quality. With a few exceptions these photographs, which picture the life and

Bausch & Lomb

PLASTIGMAT f/6.8

The Perfect Photo Lens

Plastigmat *f*/6.8 represents the latest and highest achievements of the optician's art. It was designed with all the requirements of photography —pictorial, mechanical and optical—in view, and it meets the requirements.

It is a symmetrical anastigmat of longer focus than those heretofore produced, giving superior pictorial effect. It can be fitted to any camera and takes any shutter between its combinations. The anastigmatic and other corrections are perfect, and its speed is all that is required.

The single combinations are free from astigmatism and give pictures twice the size at same distance, or same size at twice the distance, at snapshot speed.

There is no symmetrical anastigmat equal to it

SPECIMEN PICTURES ON REQUEST

Bausch & Lomb Optical Co.

NEW YORK : ROCHESTER, N.Y. : CHICAGO

Manufacturers of the World-Famous

BAUSCH & LOMB ZEISS ANASTIGMAT LENSES

in Seven Series

Catalog Free

activities of New Zealand, were made by Mr. Walter Burke, whose work illustrated our last issue.

We have looked over this Christmas number from a far-away corner of the world with a great deal of pleasure, and offer our warmest congratulations to its publishers, editors and illustrators.

◆

The Photographic Monthly, formerly published by Dixon & Hoge, will hereafter be published by the Metaphysical Publishing Co., 114 West 32nd street, New York.

◆

Dr. A. Miethé's *Lehrbuch der Practischen Photographie* has reached a second edition. This is one of the best of German photographic text books, and is published by Wilhelm Knapp, Halle *a/s*, Germany. It is a handsome volume, clearly printed and easy to read. Its contents give a complete review of the everyday branches of photography, and the work has been carefully revised to date.

◆

Articles of incorporation were filed at Albany, December 23, for The Anthony & Scovill Company, with a capital of $2,500,000. This corporation was organized to control the corporations heretofore known as E. & H. T. Anthony & Co., The Scovill & Adams Company, The Columbian Photo Paper Company, of Westfield, Mass., The Monarch Paper Company, of Binghamton, N. Y., and other corporations.

The names of the incorporators are R. A. Anthony, William T. Wisner, Clarence B. Stanbury, William Edmond Curtis, F. Kingsbury Curtis, and Alexander C. Lamoutte, all of New York city; Frederick A. Anthony, of Hackensack, N. J.; James F. Chard, of Buffalo; W. I. Lincoln Adams, of Montclair, N. J.; Hugo Kohlmann, and Albert W. Putnam.

At a meeting held December 27 the following officers were elected: R. A. Anthony, president; F. A. Anthony, first vice-president and treasurer; C. B. Stan-

Trade Mark

Actien-Gesellschaft für Anilin-Fabrikation, Berlin S. O.

Photographic Department

Manufacturers of:

IMOGEN, Patented

The Latest Novelty in Developers

Can be obtained of all dealers.

Prices:	1 oz.	4 oz.	8 oz.	16 oz.
	$0.37	$1.20	$2.10	$3.95

IMOGEN is particularly adapted to the modern highly sensitive plates.

IMOGEN works clearly and brilliantly.

IMOGEN produces all the gradation, from density to fine detail, the resulting negatives being therefore of the highest grade.

IMOGEN is not much affected by ordinary variations in temperature.

IMOGEN does not injure the fingers.

IMOGEN answers very well for "stand-development."

IMOGEN answers for development of lantern-slides.

IMOGEN " for development of diapositives on gelatino-bromide plates.

IMOGEN " for development of bromide papers, etc.

EIKONOGEN ★ AMIDOL

RODINAL ★ DIOGEN

Pamphlet on Developers (2d edition 1900)

containing in 20 pages detailed descriptions and instructions for use

——— **Free on application** ———

through all dealers or through the following importers:

E. & H. T. ANTHONY & CO.
122 and 124 Fifth Ave., 17th and 18th Sts., New York

MALLINCKRODT CHEMICAL WORKS
St. Louis, Mo., and 90 William Street, New York

THE SCOVILL & ADAMS CO., OF NEW YORK
3 and 5 West 19th Street, New York

GEO. MURPHY, 57 East 9th Street, New York

G. GENNERT, 24 East 13th Street, New York

Universal exhibition Paris 1900: Gold Medal

bury, second vice-president; A. C. Lamoutte, secretary; E. B. Barker, assistant treasurer.

The Anthony & Scovill Company will manufacture and sell photographic apparatus of all kinds, including paper, films, and film cameras.

❧

The following correspondence concerning Dr. Grün's new lens, reprinted from *The Photographic News*, forms a somewhat lengthy extract for these "Notes," but the widespread interest in Dr. Grün's invention will possibly atone for this:

DR. GRÜN'S FLUID LENS.

I. *To the Editor of the Photographic News:*

SIR:—In reference to a cutting from your paper sent to me respecting my lens, I beg to say that no authorized photographs were sent by me for exhibition at Berlin. Some specimens were sent in strict confidence to Messrs. Goerz, and those photographs were sent to illustrate certain facts, and not as examples of definition. If these photographs were exhibited at the Berlin Photographic Society without my consent I consider this a breach of confidence and a libel upon myself. I enclose you a photograph taken from the stalls of the Theater Royal, Brighton, by ordinary stage illumination on Saturday last in the presence of Mr. Lewis Waller, and his theatrical company, which may give you some idea of what my lens is capable of. With regard to the statement of Dr. von Hoegh, that an increase of temperature of 2° would render the lens useless, this statement merely exhibits the ignorance of the author, as the lens has been used at temperatures between 45° and 80° without showing any appreciable difference. No doubt the German opticians have every reason to decry the value of the lens, but fortunately there is little difficulty in exhibiting and demonstrating what it can do. Photography allows of ocular demonstration which is impossible to refute, and my results are open to the world to inspect. As in publishing a statement such as you have without troubling to verify for yourselves the truth of the statement you are running yourselves perilously

Subject to no restrictions of Trade, and thus available to *all* dealers throughout the country, ROTOGRAPH NEGATIVE PAPER, in cut sheets from the smallest to the largest sizes, is bound to have an immense demand among both the beginner who desires to save expenses, and the more advanced photographer who works in large sizes and uses rough platinum, carbon and gum paper for his printing media.

Explicit directions in each package

We are now ready to quote prices and send circulars regarding this new product.

"Rotograph"

101 FIFTH AVE., NEW YORK

B. RUSEGGER, E. S. MAPES
Selling Agents

close to an action for libel—especially in the fact you state in regard to the temperature, which is absolutely untrue and capable of easy demonstration—I must ask you to kindly publish this letter and repair the injury you may have done me. Yours, etc.,

EDW. J. GRÜN.

The Hall, Southwick, Brighton, Dec. 3, 1901.

[We are always pleased at any time to publish any letter that may be either elucidatory of, or contradictory to, any statement that appears in our columns. Our German correspondent has forwarded to us a copy of the *Photographische Mittheilungen*, erstes Novemberheft, Heft 21, Jahrgang 38, in which, on p. 64 of the Vereinsnachrichten, appears in a report of the meeting of the Verein zur Föderung der Photographie of Berlin, held on October 11, 1901, the following passage:

(Translation): "First Lieutenant Kiesling exhibited a series of prints which had been made by Dr. Grün, of London, with his new lens *f*/1 to *f*/0.84. This lens consists not of solid glass combinations, but of glass capsules filled with liquids. Herr von Hoegh had stated that a similarly constructed lens was far too much influenced by temperature. A difference of 2° of temperature made the lens useless; such a fluid lens is therefore useless in practice. Prints by the inventor were submitted from the theatre, circus, etc., for which he required an exposure of five seconds. Instantaneous exposures were also shown. The pictures, which made no pleasing impression, were circulated." It will be noted that Von Hoegh states that "a similarly constructed lens," not, as our correspondent said, Dr. Grün's lens. Dr. Grün sends us three enlargements from ¼-plate negatives, and certainly two of them are by no means satisfactory as regards definition according to our ideas, but that the prints are good examples of the extraordinary powers of the fluid lens there can be no question, one at least being taken in 1/25 second by the lights used during the performance. We shall be pleased to reproduce one or two examples, with Dr. Grün's permission, so that our readers may judge of the same. With regard to the libel may we point out that

JUST OUT

A Plate Attachment

FOR NO. 3 FOLDING POCKET KODAK

HAVE ONE FITTED TO YOURS

Enables you to focus the picture on the ground-glass and to use both Films and Plates. ***Practical. Reasonable.*** We also fit our celebrated DOUBLE ANASTIGMAT LENS to this Kodak. No. 3 Folding Pocket Kodak, with GOERZ LENS, Tib Automatic Shutter and Plate Attachment, with six holders, complete, $62.80, *net* cash. PLATE ATTACHMENT AND SIX HOLDERS, $7.65, *net.*

Write for Catalogue and further information to your Dealer, or

C. P. GOERZ

Optical Works

52 E. Union Square, New York

Kindly mention THE PHOTO-MINIATURE.

the House of Lords, in confirming a judgment, stated that, "if the only meaning which can be reasonably attached to a writing is that it is a criticism upon the goods or manufactures of a trader, it cannot be the subject of an action for libel; but an imputation upon a man in the way of his trade is properly the subject of an action without proof of special damage." We must say that we cannot see any imputation cast upon Dr. Grün, and if his contention is right, then unbiased criticism upon any new process or invention is entirely barred.—ED.]—December 13, 1901.

II. *To the Editor of The Photographic News:*

SIR—I am much obliged for your insertion of my letter, and the inclusion of the full text of the criticism from the *Photographische Mittheilungen*, and I greatly regret that it was necessary for me to write to you at all, as the matter may cause some unpleasantness to Lieutenant Kiesling, who, in good faith, but imprudently, exhibited these photographs. Your letter and the extract shows me that there is an entire misconception as to the construction of my lens, which I think I can, without detriment to my patent applications, elucidate. In the first place, my lens is not constructed on the primitive principles of Sutton's or the ordinary schoolboy's lens of two watch glasses and a space filled with water; although it is possible to construct a lens in that manner, the corrections are *nil*. In my case there is a lens composed of achromatized glasses combined with a high refracting fluid of low dispersion, a lens of considerable thickness resulting, with all the surfaces in optical contact, and, as I hope, accurately corrected for the different rays of the spectrum. The formula:

$$F = \frac{u}{u-1} + \left\{ \frac{r_1 : r_2}{u(r_1 + r_2 \quad t) + t} \right.$$

Where $u = 1.5100$, $r_1 = {}^{+}4D$, $r_2 = {}^{+}3D$, $t = 2$ in., the refraction of r_2 being about 1.5900 with a dispersion of 0.01400, the intervening fluid having a refraction of 1.4985 and a dispersion of .0113.

will probably enable opticians to see the obvious advantage upon existing systems. In everyday language it

SPURR'S

SODIUM

Is a combination of sodium salts prepared in dry form, 2½ times stronger than soda crystals . . . . .

In comparing the cost of

SPURR'S SODIUM

Remember it is two and a half times stronger than Crystals, and that one pound Sodium and one ounce Pyro will make four gallons of developer that cannot be equaled in quality by any other known formula. The leading operators of the day are using it and speak of its merits. If you want fine chemical effects, with detail in both high-lights and shadows, you cannot get it with impure and cheap chemicals. You will also be surprised to find your fingers are not all stained when using Sodium.

ST. JOSEPH, MO.

In reply to your inquiry, I would say the fact that I have used your chemicals for producing the negatives for our exhibit at Detroit meeting of the P. A. of A., is the best evidence that I am pleased with them. Yours truly, L. G. BIGELOW.

For Sale by all Photo Stock Dealers

PRICES:

1-lb. can, 35 cts.; ½-lb. can, 20 cts.

BURKE & JAMES

Sole Manufacturers of Spurr's Specialties

118 to 132 W. Jackson Boulevard, Chicago

may be said to consist in the construction of what is practically a lens of crown glass of great thickness, accurately corrected and free from aberration. As glass cannot be made beyond a certain degree of thickness without flaws and striæ, this construction enables a much thicker lens to be made, whereby a greater degree of refraction is obtained with lower curves and lessened light absorption; and although you state in another portion of your paper that the absorption of light can be neglected, I can assure you that this absorption is a factor which cannot be neglected when lenses of great rapidity are required, especially thick lenses, and a lens of my construction is appreciably faster than one of relatively the same aperture constructed of solid glass. This is a point which has been put to practical and careful test. When I first constructed my lens I wrote to the secretary of the Royal Society, offering to make the society a present of one of my lenses; but the secretary, probably thinking me a hair-brained lunatic, did not answer my letter, so I was saved some £50, and secured my patent rights. Since then I have been more careful in giving information about the lens, finding it convenient to simply show results.

When the oil-immersion microscope lens was first introduced very nearly the same objections were urged against it as have been brought against my lens, but for all that the oil-immersion lens has rendered dry lenses practically obsolete, and has also led to all the bacteriological knowledge possessed at the present day.

In regard to the definition of my photographs it must be borne in mind that many have been taken from the pit of the theatre, without any proper opportunity for focusing, and under the many difficulties that must attend the taking of photographs in the midst of a crowded theatre, and that is the reason why I objected to the photographs sent to Berlin being closely criticized in regard to definition.

In conclusion, I will only say, whatever may be the merits or demerits of my lens—and time alone will tell us that—I have rendered it possible for a photographer to go to a theater and come home with a series of photographs of the performance without any special prepa-

MILLEN'S
French Satin, Jr.

THE STANDARD blue print paper of the world, with its record of nearly fifteen years, has passed the need of special mention. Everyone knows it—everyone uses it—everyone has satisfaction and pleasure in using it. Always best, now better than ever, and we do not slacken our efforts to increase its excellence. It is made perfectly and packed perfectly in sealed tin tubes, and WHILE IN THESE TUBES will keep indefinitely. We were the first to devise and carry out this method of packing, and though imitators have since sprung up, they only imitate the package, not the contents. There can be no better blue print paper than FRENCH SATIN, JR. that is our first and last word.

J. C. MILLEN, M.D.
DENVER, COLORADO

ration or apparatus, and this has not hitherto been possible! Yours, etc.,

EDW. F. GRÜN.

The Hall, Southwick, Brighton, Dec. 15, 1901.

[Accompanying this letter was a large batch of contact prints and enlargements from Dr. Grün's original negatives, including those mentioned by our German correspondent recently. The contact prints now before us are almost technically perfect, but the enlargements are not nearly so clear and distinct. This, we venture to state, is due to faulty enlarging, as the contact prints from the same negatives are very fine. Two of these pictures are reproduced with the letter given above. The particulars supplied are as follows: "Portrait of Miss Ethel Sidney, from the *Silver Slipper*. This was taken in the dressing-room of the Theater Royal, Brighton, by the gaslight in ordinary daily use in the room, with an exposure of 5 secs., with a lens 3½ inches in diameter, and 5 inches focal length, on a quarter-plate. The London Alhambra ballet had 1/25 of a second exposure from back of stalls—without knowledge, consent, or arrangement with the performers—with an ordinary hand camera, the operator sitting somewhat obliquely to stage. Lens, 2½ inches diameter, 4 inches focal length, on a quarter-plate."—ED. P. N., Dec. 27, 1901.]

◆

The *Photographische Chronik* closes a long article on the threatened American photographic combine with these words: "It is to be hoped that the picture offered by the American trusts will restrain the interested circles in Germany from founding similar institutions here, which can only have as a consequence the absolute dependence of the users and the complete destruction of small competitors."

This is clipped from *The Photographic Dealer* (London). What is the "threatened American combine"? The reorganization of the Eastman Company has already been effected, but does not contemplate any addition to the firms already known to be associated with

PENROSE'S
Process Year Book
for 1901

will be ready for delivery January 15th and will surpass all previous volumes in beauty, variety of interest, information and illustrations.

PARTIAL LIST OF CONTENTS: PAPERS ON

A Diffraction Spectroscope Camera; American and European Process Notes; A New Modification of Woodburytype; Automatic Adjustment of the Half-Tone Screen; A Wonderful Process; Collotype; Collotype as a Hobby for Amateurs; Colour Curves and Pigments; Colour Originals for Line Work; Copy for Reproduction; Developing Colour-Sensitive Plates; Direct Three-Colour Screen Negatives with Eos Emulsion; English and American Electrotypers; Experience, or Superstition?; Focusing with the Modern Anastigmat; Forewords; Half-Tone Without a Camera; How Many Dots? Importance of Accurate Type-High Blocks; Japan and Its Colour Prints; Light-Hardened Gum Solution in Surface Printing from Metal Plates; Magnesium Flashlight; Maxwell—the Master Man; On Fine Etching; On Retouching; Photographic Processes Used in Book Illustrations; Photographing Interiors with an Extraordinarily Wide Angle of View; Photo-Lithography in Half-Tone; Process Work and the Lantern; Process Work at the Antipodes; Process Work in Hot Climates; Process Work in the United States; Some Notes About Three-Colour Work with Collodion Emulsion; Some Reflections on Half-Tone in Grain; Stripping Collodion Emulsion Films; Testing Screens for Three-Colour Work; The Aerograph in Lithography; The Half-Tone Process for Machinery Catalogues; The "Johnstonia" Mechanical Engraving Process; The Progress of Three-Colour Printing; The Reproduction of Half-Tone Blocks by the Electrotype Process; The Silver Bath; The Three-Colour Printing Process; The Three-Colour Process; Trade Prospects in Australia; True and False Lamp Blacks; Uniformity in Negative Making; Why Coated Paper for Half-Tone Printing.

36 Supplements in Colors; 79 full page supplements by half-tone, grain, line, and other methods; and 87 illustrations in the text.

Attractively bound in cloth; securely packed Postpaid to any address, *$1.50 net.*

TENNANT and WARD
Sole American Agents
287 Fourth Avenue, NEW YORK

Kindly mention THE PHOTO-MINIATURE

the Eastman Company. The new combination, i. e., the Anthony-Scovill Company is, if anything, an anti-trust "combine."

◆

According to the annual report and balance sheet, Ilford Ltd., the largest manufacturers of dry plates in Great Britain, made a net profit of £53,725 (about $262,000) on the year's trading ending October 31 last. The yearly dividend is given as 12½, and the sum of $4,000 is to be distributed among the employes of the concern on the profit-sharing scheme.

◆

A notable series of photographic competitions is announced for 1902 by *The Photogram*, of London, with forty-two guineas in prizes. Particulars may be had by applying to *The Photogram*, Ltd., Effingham House, Arundel street, London. Specimen copies of *The Photogram* may be had from the American agents, Spon & Chamberlain, 12 Cortlandt street, New York.

◆

That sturdy and enterprising house, Hurman, Ltd., of Newcastle-on-Tyne, England, has purchased the business of Marlow Bros., Birmingham, and thus bids fair to control the photographic supply trade of the northern half of England. Those acquainted with the genial managing director of the firm, Mr. F. K. Hurman, will be pleased to see this evidence of growth and prosperity.

American manufacturers of photographic specialties may note with advantage that Hurman, Ltd., are open to undertake wholesale agencies for the trade in Great Britain and Europe.

A SUN-FLECKED PATH

Henry Troth

The Photo-Miniature
A Magazine of Photographic Information
EDITED BY JOHN A. TENNANT
Volume III JANUARY, 1902 Number 34

MORE ABOUT DEVELOPMENT WITH PYRO, METOL AND ORTOL

The development of the negative is commonly said to be a well-worn theme. As a matter of fact, it is a detail of photographic practice about which we can hardly know too much. There are short cuts to the solution of the problem of exposure. We can learn how to overcome the thousand and one difficulties besetting the pictorial or technical treatment of our subjects: point of view, characteristics, composition, light and shade. But the result of it all—whether done by novice or expert—lies hidden in the sensitive film. We can see nothing. Development alone can tell us in what measure we have succeeded or failed in attaining the end desired. Hence the importance of knowing all that can be known about development. It is the critical period in the making of the photograph.

To the beginner in photography, of course, the process of development is shrouded in mystery. And the beginner we have always with us. When experience has dissolved the glamour of mystery, the possibilities imagined in every undeveloped plate or film still invest the revelation of the invisible image with a fascination found in no other photographic process. The continual accession of new experience and methods, as well as an increasing activity in the exploiting of new developing agents, are other conditions making necessary the frequent revision of our knowledge of the whole subject. Wherefore there is no apology for presenting a second book on development in THE PHOTO-MINIATURE series.

The survey of developers and development given in THE PHOTO-MINIATURE No. 11 (February, 1900) closed with these words: "We have got but the barest introduction to the subject. . . . The investigations of Hurter and Driffield, and of Watkins, which have an important place in the literature and practice of negative-making, have not even been mentioned. More has been left out than has been put in if all were told. Perhaps we may return to the subject again, when what is here written will serve as the first step towards a higher footing at the next attempt." This little book is the return to the subject. It deals with methods of development in general use with greater detail and, I hope, more satisfactorily, than was possible in the earlier general survey. In its preparation, I have obtained much practical help from the papers on "Development" by Alfred Watkins, published in the *Photo-Beacon* during last year. In the publication of these papers Mr. Watkins and Mr. Todd have placed photographers under large obligations, and I am glad to know that they are now available in book form at a nominal price. Readers of these pages are urged to possess the little volume and its information. I have also drawn upon the experience and help of Mr. Charles E. Fairman, and the pages dealing with metol and ortol development are wholly the work of Mr. Henry Wenzel, Jr. Following the plan of THE PHOTO-MINIATURE, however, the information from all sources has been rearranged and made as interesting as was possible. Experts are "all very well" in their way, but their wisdom is ofttimes dry reading. Which is said without malice!

Preliminaries

There are certain exercises which necessarily precede the development of a negative by any method, such as considerations of the sensitive film, the latent image produced by exposure, the composition of a developer, its constituents, the preparation of solutions and the like. An understanding of these things is essential to intelligent manipulation. The professional photographer acquires this knowledge unconsciously by daily contact and experience, or from the conversation and methods of his fellow-workers. The amateur, usually isolated in his work, must learn by hard experience and much reading. These preliminary exercises are fully explained in THE PHOTO-MINIATURE Nos. 11 and 23, copies of which the reader should have at hand for reference. Many interesting facts about the chemistry of development can be found in THE PHOTO-MINIATURE No. 18. A fairly accurate knowledge of photographic manipulation in general will, of course, replace these special sources of information. Nevertheless, a certain amount of repetition is unavoidable here, if what follows is to be made interesting or helpful to the novice. The more advanced reader must, therefore, exercise his patience if I summarize, here and there, elementary principles and facts with which experience has already made him familiar.

How to Value a Negative

We will draw upon this patience at once by going back, for a moment, to the A B C of photography, as affording the simplest and most direct introduction to the problems to be discussed. The end and aim of all photography is the print — the positive or direct record of the thing photographed. The importance of the negative lies in the fact that it is the essential means of securing the print. Its value is in direct proportion to its capacity for yielding desirable prints. We want in the negative, therefore, only those qualities which are favorable to our obtaining what we seek in the print. In other words, we recognize in the negative only a means to an end, and value it only in so far as it helps us to attain that end. All this, so generally overlooked and forgotten except by the professional worker, — to whom it spells bread and butter — has a practical bearing on development, as will be perceived. The sooner the reader learns to regard negative-making from this practical point of view, so much the more readily will he arrive at satisfaction and pleasure in his work.

Essentials in Negative-making

In negative-making there are two essential processes: the exposure of the sensitive film to light action in the camera, and the development (or making visible) of the latent (hidden, but existing) image resulting from "exposure." These two processes are closely related and interdependent, although each has its peculiar function. A successful negative, i. e., one which will give us what we desire in the print, is the normal result of correct exposure and correct development. Unfortunately the two things rarely go together and results are usually abnormal.

Broadly speaking, the function of exposure is to impress upon (or in) the sensitive film all the details of the object photographed, the light action varying in intensity in different portions of the film proportionately to the varying luminosity at different parts of the object. It is thus seen that the amount of detail and density (or opacity) possible in a negative are practically dependent upon (or controlled by) exposure. The purpose of development is to make these details visible, and to give that amount of contrast between the different tones which will yield, in the print, a true image of the object as the eye saw it. These things are sometimes "mixed" by writers in photographic books. It is worth while remembering, therefore, that, in making a negative, we must get the details of our subject by exposure, and its contrasts of tone or light and shade by development — always supposing that the proper illumination of the subject is seen to before the exposure is given.

Exposure and Development

The process of development is peculiarly dependent on that of exposure. For every plate there is a minimum amount of light action (or exposure), and unless the plate receives this minimum exposure we cannot get an image capable of development. This explains the old rule: expose for the shadows. Unless the exposure is sufficiently prolonged to permit the shadow details of the subject to impress themselves upon the sensitive film, we cannot hope to find them in the negative after development. It also explains why the amateur who "takes a snapshot" indoors on a dull day cannot get "even the ghost of an image" despite the most patient development. The idea that details can be secured in an under-exposed plate by any choice among the developing agents has been exploded by the researches of Hurter and Driffield, and confirmed by Watkins.

In like manner there is a maximum exposure or amount of light action permissible for the plate, i. e., a period of exposure which, if exceeded, results in the reversal of the image, so that development gives us a positive instead of a negative image. Nipher's recent experiments along these lines will doubtless be recalled by advanced readers. Between these two extremes lies the normal exposure which, after normal or correct development, yields a negative correctly representing by contrasts of density (blackness) the gradations of light and shade in the subject. Such a negative, of course, gives a print directly reproducing these contrasts or gradations of light and shade correct in scale as seen by the eye at the moment of exposure. The amount of detail is determined by the exposure, the gradation of contrast between the tones, from high-lights to shadow details, by the duration of development.

Controlling Results

The normal or correct exposure of a plate for any subject varies immensely, according to the intensity of the light, the speed of the plate used, the size of the lens diaphragm or stop, and the character of the subject. Thus, with a given plate and lens diaphragm, the normal exposure for a seascape at midday in June may be 1/500 second. Under identical conditions, the exposure of a woodland scene with deep shadows may be one second; or, for an interior view, five minutes. It will be seen how different must be the normal development of these three widely different but normal exposures. In the exposure of the plate we have comparatively little control, but must make the best of constantly changing conditions, insisting, as far as possible, on sufficient time. In development, on the other hand, we have a certain amount of control over the result, provided only that the exposure has been sufficient. Thus we can regulate the contrasts by variations in development. Similarly we can secure special effects or qualities favorable to this or that printing method, or agreeable to the character of the subject, or modify errors in exposure. This is accomplished less by choice of the developing agent, than by varying the strength of the developing solution, and so regulating the duration of development. In other words, we can, within limits, adjust development to the plate, subject and exposure. The ability to control results in this way constitutes skill in development, and everything written about developers and development has this plain purpose—to give the reader this desirable ability.

Choosing a Developer

In the first choice of a developer (meaning here the actual developing agent, not a working formula), we are most largely influenced by the accident of circumstance. The young professional accepts, without question, the developer used in the establishment where he receives his training. As pyro has been used in nine out of ten studios the world over for thirty years or more, the professional has accustomed himself to pyro without regard to its actual merits, learning by daily use to adjust it to his varied requirements. Thus, all unconsciously perhaps, the professional has acquired the secret of success in development, i. e., not change of developing agents or formula, but the delicate adjustment of the developer to the plate and the conditions governing exposure in each instance. The same steadfast, unquestioning use of pyro has also taught the professional how to modify his developing solution to gain any desired characteristic or effect in his negative. Hence, when the professional, after years of studio work, takes up an entirely different branch, such as instantaneous work out of doors, he still clings to pyro and adapts it to the new requirements. In the same way printing processes come and go, each demanding different characteristics in negatives, but the professional meets every requirement by the simple variation of his developer and, perhaps, his method of development.

The amateur, on the other hand, has to begin without the guidance of personal example or environment. As a natural consequence, he begins with the developer most noisily advertised at the moment, or with some ready-to-use mixture. Failing to appreciate, by lack of experience, the importance of adjusting development to exposure, he varies his results by trying one developing agent after another. In this way (his propensity for experiment being here without immediate advantage) the amateur gains a little knowledge of many developers, but lacks an intimate acquaintance with any one. If he could have been obliged to stick to one developer, he would not only have gained more certainty in his negative-making, but the average of his results would be better than was possible under the usual conditions.

The Field of Discussion

Looking over the methods of development practiced during the past ten or fifteen years, we find that the professional has consistently adhered to the use of pyro, and that while the amateur has freely experimented with every developing agent introduced, he exhibits a preference for one of three or four. These three or four, as far as my knowledge goes, are metol, hydroquinone (adurol), ortol and (for the development of prints) amidol. There are also indications that the serious amateur is learning, more and more, to appreciate the qualities of pyro, despite the fact that it is not widely or intelligently advertised. Herein is displayed the reason why we are to discuss pyro, metol and ortol in this number of THE PHOTO-MINIATURE. As we are concerned chiefly with the development of negatives, amidol will be put aside for treatment in a later number. The combinations of pyro, metol and ortol are, of course, included here as properly belonging to our field. We will take up pyro first, as the earliest and still most widely used of photographic developers.

Pyro and Its Aliases

First, an easily skipped paragraph for those who know nothing whatever about pyro—an insinuation at which professional workers will smile incredulously! The true name of pyro is pyrogallol, but it has several aliases, "pyro" being simply a familiar abbreviation. It is sometimes spoken of as a pyrogallic acid, probably because it is prepared industrially by heating gallic acid; the name is incorrect, as pyro is not an acid. The ultra-scientific label it trihydroxybenzene, with the formula $H_3C_6H_3O_3=126$, freely soluble in water and alcohol, possessing a characteristic odor, with a bitter taste, and having a poisonous action on the animal economy—4 grains being a fatal dose for a dog, according to ancient authorities. The symptoms of poisoning by pyro are suffocation, accompanied by intense pain in the chest. Potassium chlorate accompanied by stimulants is said to be the best antidote (Leaper: Materia Photographica, London, 1891).

Commercially, pyro comes as a very light and bulky mass of white, snow-like leaflets, or minute needle-shaped crystals, loosely tufted together. Its light weight, compared with its bulk, makes it somewhat difficult to handle, as when one tries to get an ounce of dry pyro into a narrow-necked 16-ounce bottle, or to weigh out five grains of pyro in the uncertain light of the dark-room. This slight inconvenience, together with the practical disadvantages offered by its bulk in storage and transportation (and, possibly, a laudable desire to "boom" it with the novelty-loving amateur) led to the recent introduction of pyro concentrated in heavy crystals, occupying one-sixteenth the bulk of the older form, weight for weight. To pyro in this new form several trade names have been given. In America, it is known as Pyrol; in Britain, as Pyraxe. Special virtues are claimed for pyro under these aliases, which claims may be passed without comment. Pyrol and Pyraxe will do all that pyro can do—being simply pyro in another form, and are much more convenient to handle, weigh, or carry about when traveling. Apart from these details, and becaüse it is used by photographers everywhere, pyro is always readily obtainable, and costs less than some other developing agents. There are several makes of pyro in the market, but I have not observed any difference in quality among them, so that individual mention is unnecessary. Pyro of standard quality dissolves instantly in water, leaving a perfectly clear solution. If a new sample gives a discolored or muddy solution, reject it as undesirable.

Pyro as a Developer

The usefulness of pyro, in common with other photographic developers, is based on its greed for oxygen, i. e., it is a deoxidizing agent and, therefore a reducer of the salts of silver found in the sensitive plate used in photography. As it absorbs oxygen it loses its power and usefulness. Similarly, we can increase its greed for oxygen by adding an alkali to it. Protected from the air in sealed bottles or tins, dry pyro will retain its potency for years without deterioration. In aqueous solutions, however, it rapidly oxidizes by absorbing oxygen from the water. This change is shown by the solution turning brown and, finally, black. A pyro solution, thus completely oxidized, has no developing power and is simply a stain. A freshly prepared solution of pyro in water alone will develop an exposed plate, but the action of such a plain aqueous solution of pyro is so slow as to be impracticable for use. Hence pyro is always used in combination with an alkali which acts as an energizer. The addition of an alkali accelerates the process of development by facilitating the oxidation of the pyro and the consequent reduction of the silver salts forming the image after exposure. The popularity of pyro as a developer is based upon its remarkable power as a reducer, and the ease with which its action can be controlled or adjusted to the most variable conditions. Once well understood, pyro is seen to be a simple developer—simple in its composition and in its action. It is capable of almost infinite modification, and can be made to produce the most varied effects. Last, but not least, it gives a negative of fine printing quality.

All Its Disadvantages

Pyro has its peculiarities, which are sometimes magnified into faults. Let us put its disadvantages all together, and see them at their worst. The comparatively rapid oxidation of pyro in solution, while conferring a desirable power in development, gives rise to troubles peculiar to development with pyro. First, it renders difficult the keeping of pyro solutions ready for use. This touches the amateur who uses his camera only occasionally, with long intervals between his developments. The man who develops daily makes his solutions as needed and in quantities sufficient for his use. As we will see, the difficulty can be overcome by adding a "preservative" to the pyro solution, by means of which it may be kept ready for use for months. Another way is to use dry pyro in small quantities as required. Or we may avail ourselves of one of the standard ready-to-use pyro developers, such as Seed's

Pyrox or Hauff's Pyrol tubes. The English worker has his B. & W. Tabloids.

Second, the oxidation of pyro produces a stain and, as oxidation proceeds most actively during development (the solution being then most exposed to the air), this stain penetrates the gelatine film, giving it a yellowish, non-actinic color. Hence pyro-developed negatives are usually said to be "slow printers." Many workers think, as I do, that this pyro stain is (within limits) a decided advantage to the negative, giving it a desirable printing quality which more than offsets the little extra time required to obtain a print. Thus for platinotype and the carbon printing methods (gum and ozotype) pyro developed negatives are decidedly preferable. But here we are on the debatable field of opinion! Where the pyro stain is not desirable, it can be prevented or controlled to a nicety by regulating the amount of sulphite of soda added to the developing solution, of which more hereafter. But the pyro stain will discolor fingers and clothes as well as the gelatine film. This is a difficulty not so easily overcome. Old pyro users claim that carefulness and cleanliness in manipulation will obviate the trouble, but their finger-tips belie them. Others say that their particular formulæ do not stain the fingers. Such a formula will be given later "as a guarantee of good faith." Perhaps the surest way of minimizing the difficulty, however, is the use of the factorial method of development (Watkins' system) by which the fingers are practically kept out of the developing solution as unnecessary.

Finally, the oxidation of pyro and its consequent loss of developing power, practically prevents the use of the developing solution more than once. This is offset by the cheapness of pyro, and the manifest advantages peculiar to the use of freshly prepared (uncontaminated) solutions for each exposure or batch of plates.

Water

A word or two must be said about water before we proceed. Water plays an important part in all methods of development, and especially in development with pyro. Distilled water is undoubtedly most desirable, particularly for the making up of stock solutions of pyro. It can be obtained at a nominal price from the nearest druggist, but few workers will take even this slight trouble. If distilled water were used for the preparation of all developing solutions, half the difficulties of development would disappear. Where it is not available, rain water filtered through muslin or coarse flannel to remove mechanical impurities, is good; so is melted ice after being filtered. Ordinary tap water should be well boiled, allowed to cool, and filtered. The boiling will expel the superabundant air found in city water delivered at high pressure, and at the same time will precipitate any carbonates of lime or magnesium it may contain. River and lake waters are sometimes contaminated with vegetable and organic impurities, and well water often contains traces of iron and sulphur. Unexplainable troubles connected with the preservation of solutions or the color of the negative after development can generally be traced to impurities in the water employed.

In dissolving the chemical salts used for the preparation of developing solutions, cold water should be employed in all cases except for solutions of the alkalis, where warm water offers advantages. Pyro should never be dissolved in warm or hot water, in which respect it differs from some of the modern developers.

Constituents of a Developer

Let us now look at the constituents usually included in the composition of a pyro developing solution. We have seen that pyro, in combination with an alkali, is an energetic reducer of the silver salts. The simplest pyro developing solution, therefore, would be an alkaline solution of pyro. It is obvious that in such a developing solution pyro is the active agent or developer proper, and that the alkali is the energizer or accelerator, simply influencing the speed at which the developer does its work in the film. The alkalis most generally used with pyro are the carbonates of soda and potassium. Formerly, and chiefly in Britain, a caustic alkali (ammonia, 880) was much employed, but at present this has been practically abandoned in favor of the more stable carbonates. Latterly acetone has been proposed as a substitute for the alkalis, but it is rarely used.

The Work done by Pyro and Alkali

The amount of work which the developer can do in the exposed film being practically determined by the exposure (or amount of light action) it has received, it follows that the speed or rapidity of development depends upon the strength of the developing solution, i. e., the proportionate amounts of developing salt and alkali it contains. On this point Watkins says: "It is found by experience that there is no advantage in using very strong developing solutions, and that, on the other hand, very weak solutions take too long to do the work. For instance, with pyro it is known to be useless to have more than 8 grains of pyro to the ounce of water, and 4 grains is the maximum working amount. On the other hand, 1 grain to the ounce may be taken as the minimum useful strength. Within these limits the rapidity of development varies with the strength of the developer, the proportion of alkali to the developing salt remaining the same. . . . In the same way the proportion of alkali to the developing salt lies within narrow limits, being (with carbonate) from six to twelve times the weight of the developing salt. The published formulæ of the handbooks and the plate-makers are fairly safe guides in this matter." (Watkins: Development, Chicago, 1901.)

Sodium Sulphite

To prevent the formation of the stain product of oxidation and consequent staining of the negative during development, sodium sulphite is almost invariably included in pyro development formulæ. It is commonly supposed that sulphite acts as a preservative of pyro, i. e., prevents its oxidation in solution. Latterly the correctness of this view has been debated, and the more rational understanding is that it acts simply as a decolorizer, bleaching agent or stain preventive. Its real usefulness, therefore, is in regulating the color of the negative, wherein its influence is beyond question. Without sulphite, the use of alkaline pyro produces an image of silver in gelatine *plus* a yellow stain due to the oxidation of the pyro. In proportion to the amount of sulphite added to the developing solution the negative loses this characteristic yellow pyro stain, i. e., the image is black with gray half-tones instead of brown or greenish black. Chapman Jones has pointed out that the amount of sulphite should be in proportion to the bulk of the solution and not in proportion to the amount of pyro. Watkins says that not less than 20 grains of sulphite to the ounce of developing solution should be present. The determination of the amount, however, must depend largely on the quality of the sulphite, and the personal opinion of the photographer as to the color desired in the negative. In America, where the question of sodium sulphite in development is constantly agitated, the salt is usually added to the stock solution of pyro or made up in a separate solution. In England it is usually added to the alkali.

Potassium Bromide

Another ingredient usually found in formulæ for pyro development is potassium bromide, almost invariably used in the form of a 10 per cent solution, and spoken of as the restrainer or retarder. Until very recently bromide was considered to be essential in pyro development, as preventing or holding back the appearance of fog and restraining the development of detail, while the high lights or higher tones were gaining density. In this way the use of bromide was supposed to increase the contrasts in a negative when flatness or lack of contrast was feared as the result of overexposure. It has been found by Hurter and Driffield, however, that the addition of bromide is practically unavailing for this purpose when once development has well begun. It is true that, when added to the developer before development, bromide will hold back the appearance of the lower tones; but, as Hurter and Driffield have demonstrated, this restraining power is lost if the development is prolonged. And our modern plates have not the fogging propensities of the earlier product. For these reasons the cult of bromide has latterly declined. It is still true, however, that where overexposure is known before development increased contrast can be obtained in the negative by the use of a strong developing solution with bromide. In such a case the flatness or lack of contrast normally resulting from overexposure is compensated by the completion of development within the holding back stage, due to the presence of bromide.

Pyro Preservatives

Finally, in order to keep pyro in a stock or concentrated solution, ready for use as required without deterioration, it is essential that the solution should be acid in condition. This is secured by the addition of an acid or acid salt, which is known as the pyro preservative. Sulphuric, sulphurous, citric, acetic and oxalic acids are employed for this purpose, the first and last being most favored. In Britain the acid salt metabisulphite of potash is quite generally used for the same purpose, one-half the weight of the developing salt being a sufficient amount.

How to Develop

With this general knowledge of development and the composition of pyro developers, the reader should be ready to take up the practical use of pyro and, with a little experimenting, adapt it to all his requirements in negative-making. We have seen that the amount of detail and density possible in a negative are controlled by the exposure. In this the importance of correct exposure is emphasized and, failing this, the necessity of an exposure sufficient to secure the shadow details of the subject. We have seen that the purpose of development is to secure in the negative that gradation of density contrasts between the tones which will properly represent the scale of tones, from light to dark, in the object photographed. This is accomplished, first by adjusting the strength of the developing solution so that it will give the desired amount of contrast in a convenient time, and, second, by stopping the development when the amount of contrast required has been obtained. The professional photographer, as we have seen, gains this knowledge of adjustment and when to stop development by experience and continual practice. The amateur, of course, can learn in the same way, but the method is time-consuming and expensive. A better and more intelligent way is the use of the factorial method proposed by Mr. Watkins, sometimes called the Watkins system of time development. This method is briefly described by Mr. Watkins in the following paragraphs:

Watkin's System: Factorial Development

"About 1893 I found, after many trials to establish the fact, that any change of temperature (within limits) or of amount of alkali, and also strength of developer, with most developers, which lessened or increased the time required for a certain amount of contrast in the negative, also altered the 'time of appearance' in exactly the same ratio.

"The 'time of appearance' is the time elapsing between pouring on the developer and the first appearance on the plate of any trace of the image.

"My plan, therefore, is to develop the plate for a certain multiple of the time of appearance, and a standard amount of contrast will always be secured, even with considerable changes of temperature or alkali. This multiple is called the multiplying factor. With most developers the multiplying factor remains the same for different strengths of developer, *but pyro is an important exception to this.*

"It really amounts to making a test of the activity of the developer and the regulating of the time of development accordingly.

Procedure

"You have decided what developer to use and have it ready mixed (according to instructions given by the plate-maker) in the graduate. Place the plate face upward in the dish, take out your watch, and the moment the second hand touches an even minute, pour on and rock the dish; watch very carefully the creamy surface of the plate and the moment any trace of the image (the high lights come first) begins to appear, note the time. The time elapsing between pouring on and the first appearance is the time of appearance, and this, multiplied by the multiplying factor, gives the total time for development. When you have noted the appearance of the image, cover up the dish from the dark-room light, as it need not be looked at again until the calculated time is up. The dish should be rocked occasionally. It is usually convenient to count seconds when you pour on, a half-second pendulum (as used in my exposure meter) being a convenient timekeeper, as the beats can be counted by touch without looking at it.

"When the time has elapsed, pour the developer out of your dish or tray and wash the plate (still in the dish) with water from a tap or jug. There is no need for more than a rapid swirl. Then place in the hypo solution in the dish set apart for that, the plate being still face upward. Wash after fixing. When dry the negative is ready for printing from.

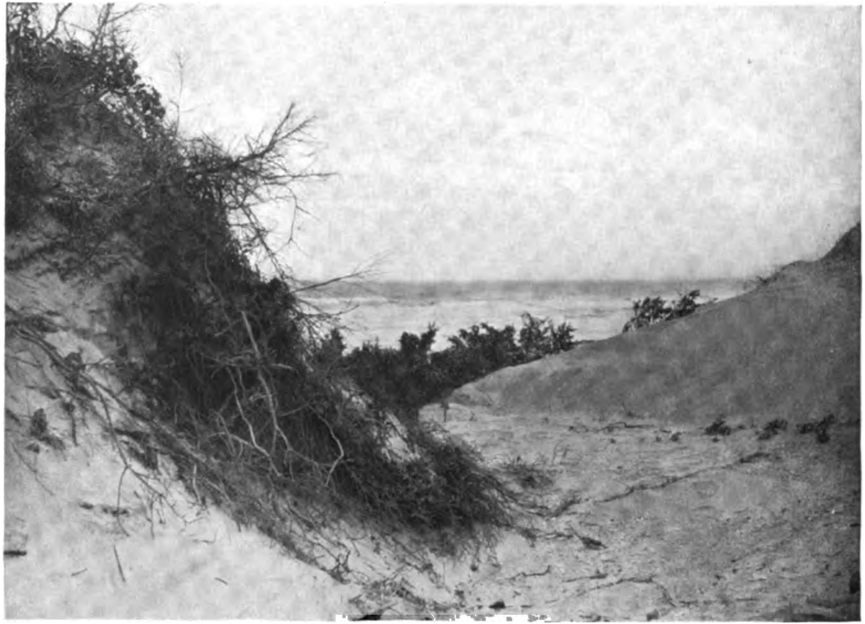
Demonstration

"Example of use of the multiplying factor: The Cramer Pyro soda developer of minimum strength (about two grains pyro to ounce) is used and the approximate factor for this is 12. The image appears in 30 seconds and it must therefore be developed for 6 minutes. It must be clearly understood that when I quote a multiplying factor for a particular developer I give it as a guide for the first trial, and it is quite likely that the factor may require to be altered to suit individual needs, but when *once* fixed upon it need not again be altered. If the suggested factor gives too much contrast in the print, use a shorter factor in future; if the print is too flat or lacking in contrast, use a longer factor. In this system the exposure decides the density of the negative, and the development the contrast between the tones. Do not attempt to regulate the density of the negative by the development." [Watkins: Development, 1901.]

Suggested Factors

As an aid to the use of this admirable system Mr. Watkins suggests the following multiplying factors for pyro-soda developers of different strength, without bromide and with it.

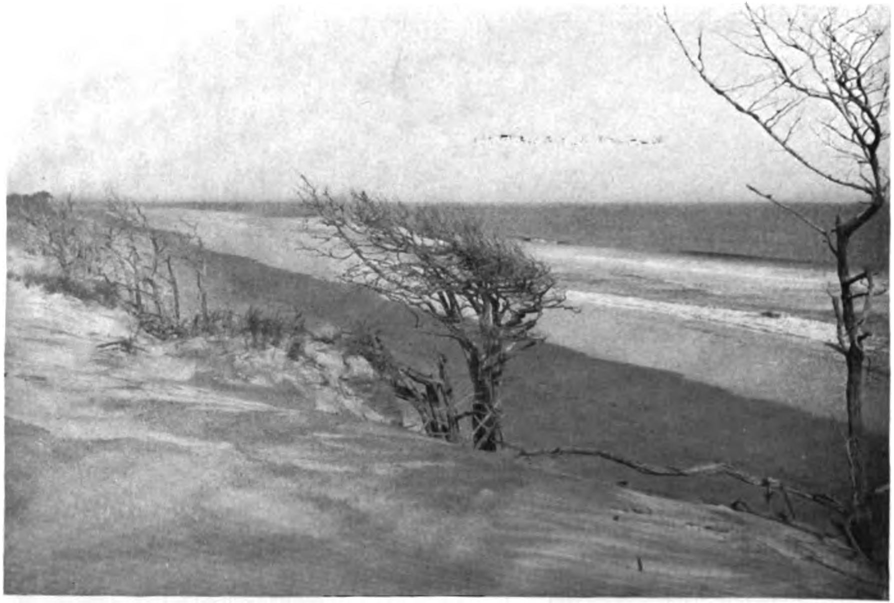
For a developer containing, per ounce of solution	FACTORS
1 grain pyro, no bromide	18
2 grains pyro, no bromide	12
3 grains pyro, no bromide	10
4 grains pyro, no bromide	8
5 grains pyro, no bromide	6½
Or	
1 grain pyro and ¼ grain bromide	9
2 grains pyro and ½ grain bromide	5
3 grains pyro and ¾ grain bromide	4½
4 grains pyro and 1 grain bromide	4
8 grains pyro and 2 grains bromide	3¼



A GLIMPSE OF THE SEA

Henry Troth

London Salon, 1900



THE WIND-SWEPT COAST
Henry Troth

Grains Pyro per ounce Developer

The convenience of this table, as supplying a guide to the multiplying factor when the strength of the developer is changed, will be readily perceived. Similarly, when testing a new formula, find the number of grains of pyro contained in the developing solution proposed for a normal exposure, and the table will give the approximate multiplying factor. As a guide to the factors for different plate-makers' pyro developers Mr. Watkins gives the following computation of the grains pyro to the ounce of each. The multiplying factor can be found in the "no bromide" list given above. Seed's A B C Developer, 5; Seed's pyro, 2½; Cramer, maximum strength, 5; minimum strength, 2; Hammer, 2¼; Eastman, 2; Carbutt, maximum strength, 2½; minimum strength, 1½ (this developer contains bromide).

Eikronometer

As a further aid in timing development by this system, Mr. Watkins has provided a clock, known as the Eikronometer, which measures seconds and minutes, and is supplied with a circular rule on its circumference by which to multiply the "time of appearance of image" by the "factor." The "time of appearance" is measured by setting the clock to just before the figure O on the dial, pouring the developer on to the plate as the hand touches O, and noting the number when the high lights of the image first emerge from the surface of the plate. This number represents minutes; the movable indicator is now set to this number and the plate is removed from the developer when the hand on the dial reaches the number so indicated. In most cases, however, the multiplication involved is so simple that there is no need to use this calculator. In practice the system is simple and efficient, obviating all necessity for handling plates during development, or putting one's fingers into the solution, and providing a certain means of obtaining negatives of uniform density.

Varying the Factor

It must not be supposed that the method reduces development to an automatic operation. We are always free to adopt any multiplying factor we desire, according to our personal preference in the amount of contrast desirable or needed for the printing paper to be used. It will be obvious, also, that change of factor will produce changes in the appearance of the negative. Thus pyro may be used as a soft-working developer, or hard-working developer as we may prefer. If we use a developer weak in pyro (those with high factors in the table) the details of the subject will appear quickly in development and density will come comparatively slowly. By withdrawing the plate at the right moment a thin, detailful negative can be secured. If, on the other hand, we use a developer strong in pyro (those with low factors in the table), the lowest tones or detail will appear slowly, during which period the high lights will attain considerable density. Thus the withdrawal of the plate at the right moment will give a contrasty negative if such is desired. This is in accordance with the rule that increase of contrast is regulated by the duration of development. It should not be forgotten that the operation of this rule is limited. Thus, when the developer has completed its work with the highest lights in the image, increase of contrast ceases. Similarly, when fog sets in, it is generally impossible to further increase the contrasts.

In the treatment of overexposure we have two remedies. When overexposure is known before development, use a low factor developer with plenty of bromide. This will enable us to complete development while the bromide exerts its restraining power. Where overexposure is not observed until development is well begun, the development should be carried through to the end. The resulting negative will be over-dense and a slow printer, but the gradations of contrast between the tones will be correct.

In developing negatives in which the main object is light in tone or color, as a child in light draperies, sky negatives, snow scenes, etc., for which the properly shortened exposure has been given, take the appearance of the main object for the appearance time, and multiply by one-half the usual factor. Where the subject is largely in shadow, without boldly lighted details, watch for the appearance of the detail and use a shorter factor, say three-fifths of the usual figure. Used as here indicated, an intelligent application of the factorial system will go far to the satisfactory solution of difficulties resulting from under- or overexposure.

A Formula

My purpose in presenting this account of the factorial method of development is to show the reader how to acquire for himself a practical knowledge of the "why and how" of development, rather than to induce him to follow specific directions and formulæ in order to get this or that result. Once grasped, the factorial method is without doubt the most rational, as well as the most profitable of systems, for pyro development. In its use the worker has an intelligent comprehension of the tools with which he works, and can thus readily control his results by varying the means at his disposal. Since, however, some will not be satisfied unless formulæ are given, a few selected formulæ for pyro developers are offered. They have all been proven by experience, and the reader can use them with confidence.

Dry Pyro Developer

Fairman's formula, for the use of dry pyro, peculiarly adapted for those who develop at irregular intervals: Dissolve 1 ounce of sodium sulphite in 3 ounces of distilled water heated to boiling point and, when the salt is dissolved, add water to make solution up to 4 ounces. Keep this in a well-corked 4-ounce bottle, labeled "Sodium Sulphite 1-4." Dissolve 1 ounce of sodium carbonate similarly in 3 ounces of hot water, make up to 4 ounces of solution, and label "Carbonate of Soda 1-4." Dissolve 1 ounce of potassium bromide in 9 ounces of cold water, add water to make the solution up to ten ounces, and label "Potassium Bromide 1-10." With these keep on hand an ounce of dry pyro resublimed, or pyrol, well covered from the air.

When ready to develop, take a 6-ounce graduate or other container with measures marked in drams and ounces. Pour into this ½ ounce of the "Sulphite" solution; dissolve in it 5 grains of pyro; add 2 drams of "Carbonate" solution, and 5 drops of "Potassium Bromide 1-10." Finally add water to make the developing solution up to 5 ounces in winter time, or 6 ounces in summer time. This gives 1 grain of pyro to the ounce of developing solution, and ½ grain bromide. The approximate factor is, therefore, 10.

Here, however, we will put aside the factorial system for a time, and see how the old-fashioned amateur would get experience. Mr. Fairman thus presents the method of using his formula as given above.

The Old Way

Presupposing that we have a correctly exposed negative ready in its tray in the dark-room, the developing solution is poured upon the plate, care being taken to thoroughly cover the whole surface of the plate by a single swirl of the solution. The developing tray should now be kept in such a position that the light from the dark-room lantern does not fall directly on the plate. This is to avoid any possible light fog. Keep the solution flowing back and forth over the plate by a gentle rocking movement of the tray in the hands. In from twenty to thirty seconds we will notice that the strongly lighted portions of the subject are beginning to appear on the plate.

The negative may now be lifted from the tray and examined *very briefly* by transmitted light and then returned to the tray for further development.

At the first examination we may be able to see a dim outline of the stronger lighted parts of the image, but the shadows are hardly appearing. We must remember that we exposed for the shadows, and, if our exposure was properly timed, the whole negative should develop with a proper relation to the light and shade upon which the plate was exposed, i. e., the shadows should be clearly visible before the reduction of the silver in the high lights has proceeded so far that the negative is too full of contrasts.

Following along the development of a properly exposed plate we shall find that, after the detail in the shadows is well defined, the brilliancy in the shadows is becoming dull looking or discoloring, and that the high lights in the negatives are becoming blacker as we view the negative by transmitted light. The whole question now is to decide when the proper amount of density has been secured, and in this there is no fixed rule. We must remember that the clearing action of

ACROSS THE LEDGES
W. G. C. Kimball

AMONG THE HILLS

Howard P Bartram

the hypo bath will make the negative much more transparent than it appears when viewed by transmitted light in development, and due allowance must be made for this clearing or fixing of the image. We should also remember that different makes of plates differ in the amount of change produced by the clearing bath. It is well for the beginner to wait until the first plate has been developed, cleared, washed and dried, so that if errors have been made in the development the error will not be repeated.

Overexposure

We will now make up a new developing solution and take a very badly overexposed plate. If we do not know this fact, and prepare our developer as for a normally exposed plate, we will find that the image appears rapidly, the shadows and high lights appearing almost simultaneously. Forgetting the maxim to keep the plate always under control, before we recover from our astonishment we find that the plate is so far developed that it is flat, lacking in contrast, and grayish in color. If, however, we keep our wits about us and recognize that it is a case of overexposure; we immediately take the plate from the developer and place it under running water, thoroughly washing it until we have washed the developer from the film and completely arrested the development. If the detail seems well defined, we throw away the developing solution with which the development was started and prepare a fresh developer with the same quantity of pyro, sulphite and potassium bromide, using but 10 or 15 minims of our carbonate of soda solution. The plate should then be carefully watched, and if we find that the shadows are not developing with a proper relation to the high lights, we should add more carbonate of soda. If, however, we find that we are not securing such density or blackening of the image as will give us a negative with good printing qualities we should add more pyro. All the time we should keep the plate under full control. This is the keynote to successful development, and in no way can this be accomplished unless we keep our alkali (accelerator) and pyro (reducer) in such proportions that we can gain detail or density as we desire.

Underexposure If we find, upon use of a developer prepared for a normally exposed plate, that within 30 or 40 seconds there is no trace of the stronger lighted parts of the negative appearing, we may conclude that the plate is underexposed. We do not know how much underexposed, but must save the negative. The greatest care must be used here or the negative in a short time will be fully developed in the high lights and the shadows will be lacking in detail.

Wash the plate as quickly as possible and place in a tray containing water 3 ounces, sulphite of soda solution ½ ounce, pyro 3 grains. Let the plate remain in this tray for 1½ minutes, and then transfer it to a tray containing water 3 ounces, carbonate of soda solution 3 drams. Let the plate remain in this tray until the detail is well developed; then return to the tray containing the pyro solution and allow it to remain until the density is nearly sufficient, when it may be returned to the tray containing the carbonate of soda solution for a short time. The tray with the pyro solution can be strengthened by the addition of more pyro and the plate returned to this tray and developed until the proper density is secured.

This is but another manner of keeping the plate under control. We neither let it gain in density or in detail too rapidly. Detail secured too soon gives a flat negative, lacking in tone or brilliancy; density gained too soon gives a harsh negative wanting in detail in the shadows and proper gradations in the middle tones.

Developing Brief Exposures It may seem novel to some to state that exposures of $\frac{1}{1200}$ of a second, not waterscapes, are developed by using a developer both weak in acceleration (alkali) and reducer (pyro), say of one-half the normal strength. After using the developer for twenty minutes it is thrown away and a fresh developer of the same strength is employed. This course is pursued until the detail is well defined, when the proper density can be secured by the addition of pyro and developing for density alone. It is not uncommon by this method to occupy from one and one-half to nearly two hours in the development of a plate.

Saving Time

It sometimes happens that we have a plate known to be badly underexposed, and cannot afford to spend say an hour and a half or two hours in the development of one plate. For such a plate we may use 60 grains of carbonate of soda, and 120 grains of sulphite of soda dissolved in 12 ounces of distilled water. To this add 8 grains of dry pyro and 1 dram of a 10 per cent solution bromide of potassium.

The plate should be placed in the tray, the developer poured over the plate, and the tray gently rocked for a few moments, when it should be carefully covered and may be left to develop for an hour without danger. I have seen plates developed in this manner for eight hours, resulting in negatives with exceptional detail and good printing qualities.

The only difficulty of this class of development is the tendency to render the negative too dense, but as reduction is a comparatively safe operation, many negatives may be saved in this manner which would otherwise result in utter failure.

It cannot be contended that any exposure can compare with a correct exposure, and yet with a pyro developer in the hands of an intelligent dark-room worker, I have known plates exposed upon the same subject, one of which was given $\frac{1}{25}$ of a second, the other 10 seconds, and so manipulated in development and printing that it was impossible to determine which print was made from the short and which from the negative having the long exposure. This was done to prove that pyro as a developer gave more possibilities of a wide range of exposure than any other developer.

Developing White Draperies

Among the test subjects for a developer, white draperies, as worn by women and children, have always been regarded as difficult to handle. Generally speaking, such subjects should be slightly overexposed, and the development watched with a view to preventing overmuch density.

The tendency in development is to make the negative too dense, so that the high lights are chalky and show in the print no resemblance to the texture of the draperies photographed. Another common tendency when overexposure is intended is to overexpose too much, causing flatness in the negative and resulting print. I think the best plan to adopt is to give what may be termed a full exposure and cut down the amount of the pyro to about 2 grains per ounce of solution used, watching the development until the detail is clearly defined. Then add pyro, and continue the development until sufficient density has been gained. A little practice will enable the worker to correctly judge the proper density by examining the negative by transmitted light. It should be understood that all of the foregoing suggestions refer to the use of pyro in a dry form, being mixed with the sulphite and carbonate solution, at the time it is used for development. This is advised for those who practice photography but little, as the pyro is then fresh and in full strength, and you know what to depend on with more certainty than when pyro is kept in solution and its strength is uncertain. Now for more formulæ!

Stainless Developers

Frobisher's formula, giving brilliant negatives, for hand-camera and instantaneous work, films, etc.; said not to stain plate or fingers and to possess good "keeping" quality:

I. Water, 12 ounces; sodium sulphite (cryst.), 3 ounces (if "dry" 1½ ounces); ammonium bromide, 20 grains; citric acid, 60 grains; sulphurous acid, 1 ounce; pyro, 1 ounce.

II. Water, 12 ounces; sodium carbonate, 4 ounces (if "dry" 1 ounce, 4 drams, 48 grains).

For normal exposures take 1 dram each of I and II and add 2 ounces of water.

Edel's formula, in which pyro is added dry, as required. Warranted not to stain and highly commended:

Dissolve in 10 ounces of warm water 1 ounce sodium sulphite (cryst.); add carbonate of soda, ½ ounce; yellow prussiate of potash, ½ ounce; and make the solution up to 16 ounces.

For normal exposures take 2½ grains of dry pyro to each ounce of the above required for use.

A Favorite

Mr. Fairman sends the following formula, which, he avers, has been passed round by enthusiastic amateurs for years and always gives satisfaction. It has the virtue of "keeping" for years without deterioration, and was originally given as especially suitable for the development of white draperies. This, however, depends most largely upon the "man behind the gun:"

I. Water, 6 ounces; pyro, 1 ounce; alcohol, 1 dram; sulphuric acid (added slowly, drop by drop), 3 minims.

II. Water, 32 ounces; sodium carbonate, 192 grains; sodium sulphite, 1½ ounces.

For normal exposure take 1 dram of No. I and 4 ounces of No. II, adding 3 ounces of water. If over-exposure is indicated or feared, add a few drops of potassium bromide, 10 per cent solution.

Bardwell's Acetone Pyro

The acetone-pyro formula given by Jex Bardwell in THE PHOTO-MINIATURE No. 11 has given so much satisfaction that we may well end this miscellany with another formula from Mr. Bardwell, which is perhaps more convenient for use than that previously given. It will be remembered that acetone was proposed by the Brothers Lumière as a substitute for the alkalies generally used in pyro development. The acetone mentioned is that marketed by Mallinckrodt, and obtainable from most dealers in chemicals at about 29 cents per pound. Prepare three stock solutions.

I. Water, 20 ounces; potassium metabisulphite, 120 grains; pyro, 1 ounce. This will "keep" for months.

II. Saturated solution of sodium sulphite.

III. Water, 7 ounces; acetone, 1 ounce.

For use mix in the order here given: Water, 1 ounce; No. II, 2 drams; No. I, 2 drams; No. III, 1 ounce.

Two or three negatives may be developed in this solution one after another, but to ensure uniformity, the use of fresh solutions is advised.

Ready-to-use Developers

Of the ready-to-use pyro soda developers in the market, I have used Seed's *Pyrox* since its introduction with increasing pleasure and satisfaction. A careful test of the new Hauff's *Pyrol Tubes* also warrants their mention here. The amateur desiring to give pyro a practical trial may safely begin with these, and save much inconvenience and uncertainty.

We will now leave development with pyro and look over the formulæ and methods offered for the use of metol, ortol and their combinations. Among these we will find pyro-metol, which is a great favorite among those who cannot accept pyro with unreserved enthusiasm; and the famous Nepera M Q (metol-quinol) developer, which has probably been more widely used than any of the modern developers. Mr. Wenzel, who gives us here his formulæ and experience, prefers to present his formulæ first, and then to tell of their use and advantages. We shall certainly let him have his way in the matter.

Metol

A. Metol, 30 grains; potassium metabisulphite, 10 grains; potassium bromide, 5 grains; water, 5 ounces. *B*. Sodium sulphite (desiccated), 120 grains (or crystals, 240 grains); sodium carbonate (desiccated), 100 grains (or crystals, 240 grains); water, 5 ounces.

Quickly Prepared

This formula may be quickly prepared by the use of 10 per cent solutions; or by hydrometer, by substituting 5 ounces of a 10 per cent solution of sodium sulphite crystals (hydrometer, 28), for 5 ounces of water in solution *A*, and using, instead of solution *B*, 5 ounces of a 10 per cent solution of sodium carbonate crystals (hydrometer, 23).

Directions for Use

A and *B* combined form a one-solution developer for normal exposures. For use as a two-solution developer for normal exposures take equal parts of *A* and *B*. For underexposures take of *A* 1 part, *B* 1 part and water 1 to 2 parts, according to the assumed degree of underexposure. For overexposures take of *A* 2 parts, *B* 1 part and add 10 per cent solution of potassium bromide as required.

Hypo in the Developer

The addition of from one to five drops of a 10 per cent. solution of hypo-soda to each ounce of developer (in addition to the bromide of potassium called for in the above formula) retards development and keeps the shadows clear in case of overexposure. It should *not* be used in solutions prepared for the development of Velox or bromide papers.

Potassium Bromide

The quantity of potassium bromide required for some plates is very much in excess of that required for others. The quantity given in the above formula may be taken as the minimum.

For transparencies and lantern slides take equal parts of *A* and *B*, and to each ounce of solution add 5 drops of a 10 per cent solution of potassium bromide. For bromide papers take equal parts of *A* and *B*, or if softer results are required take 1 part *A*, 1 part *B*, and 1 part water. For Velox papers, both "regular" and "special," the use of the following variation of the above plate formula is advised: metol, 50 grains; potassium bromide, 1 to 2 grains; sodium sulphite (desiccated), 120 grains; sodium carbonate (desiccated), 100 grains; water, 10 ounces. Do not dilute this developer for "special" papers, but lessen the printing time. This formula provides all the bromide necessary to keep the whites pure under ordinary circumstances. The image appears suddenly even under normal conditions; this is not to be taken as an indication of over-printing. The formula has yielded surprising results with contrasty negatives, and the most pleasing results have been obtained with the "regular" Velox papers.

It being easier to add a cipher to each item to increase the quantity of solution tenfold than to reduce larger quantities, the formulæ already given and those that follow have all been made up to yield ten ounces of solution: this has another advantage in that the grains per ounce of solution of reducer, accelerator, etc., may be seen at a glance.

Compared with other Developers

Metol is so unlike pyro, hydroquinone and other reducers of the so-called "hard-working" class that it has been assigned to the "soft-working" class to indicate that the results obtained by its use are negatives lacking in density and contrast and for these reasons "soft." That ordinarily such negatives do result from its use is not to be denied; that such negatives and not the opposite, i. e., negatives of any desired contrast and density, need result from its use is not admitted, for, as is well known, the obtaining of contrast and density is a matter of the plate used, strength of developer and duration of development, rather than of the particular reducing agent employed.

Compared with pyro, amidol and other reducers noted for their tendency to rapid deterioration and to stain plates, papers and the hands of the operator, metol keeps remarkably well and is practically stainless. The image it yields is of a bluish black color and is in this respect most like that obtained with amidol and unlike, both in color and printing quality, the non-actinic brown-blacks of pyro, ortol, etc.

Metol enjoys an unenviable reputation as a very irritant poison—to some people; the vast majority of those who use it, however, suffer no inconvenience.

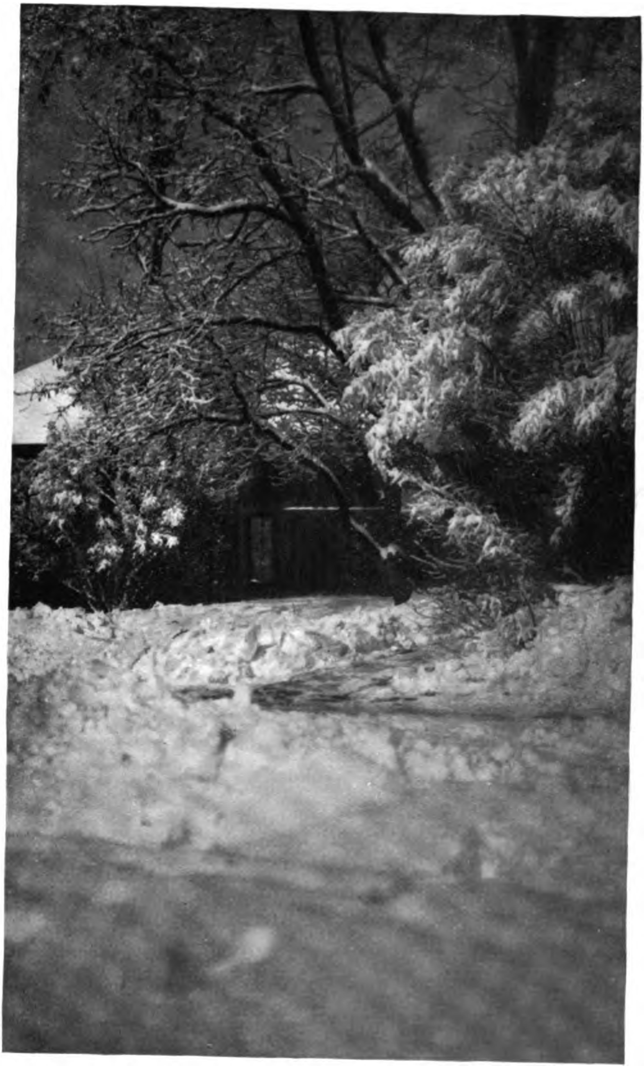
Fixing Out

There is a loss of apparent density during fixation in negatives developed with metol that has had much to do with the soft negatives resulting from its use. The purchaser is enjoined by the manufacturer of the product to use enough metol to make possible the obtaining of sufficient density. He is advised, also, to obtain more apparent density, judging by the transmitted light of his ruby lamp, than he actually needs, so that the real density obtained after fixation will be what is wanted. It is of a piece with the advice to print one or two shades darker than the finished print is to be, when using print-out papers, only that indefinite as all such advice is to the beginner, it is much easier to follow in full daylight with printing papers than with the feeble light of the average ruby lamp. Better and more sensible advice to every user of metol would be to use the Watkins system of development and so avoid underdeveloped negatives, soft negatives and, maybe, unsatisfactory negatives also.

Metol: Watkins System

This system as explained for use with pyro is, of course, applicable to all developers. The multiplying factor for metol is 30, and on reaching the expiration of the

.1.1.6-1



CHRISTMAS NIGHT, 1901
A true moonlight view
James H. McCorkle

FEBRUARY

Howard P. Bartram

time obtained by such multiplication the plate is removed from the developing tray to the fixing bath. The appearance of the image may be quickly followed by its disappearance, nevertheless the negative should be allowed to remain the full time for development before removing it from the tray. If sufficient density is not obtained with 30, this developing factor may be increased until a factor is found that will give the density required. The plate may be covered over after the high lights have appeared until development is complete. This will lesson the liability of fog from other sources than the developer. The formula I have given is designed to yield negatives free from chemical fog; by its use with the Watkins system of development density is obtained and both chemical-fog and light-fog avoided, if the simple precaution be taken to keep the developing solution at a proper temperature.

Under-exposures

Underexposures — metol: the one suggests the other, for with the advent of metol much of the time, care and patience required in the development of underexposures with pyro was rendered unnecessary, so that metol soon became, and has ever since remained, the popular reducer for short exposures and what is known as "high-speed work." Other reducers have been combined with it and these combinations, such as metol-hydroquinone, metol-pyro, etc., used instead of metol alone for the same purpose, but it must be remembered that, after all, metol is the factor of most importance in all such combinations prepared especially for the development of underexposures. When normal- and overexposures are to be developed, particularly the latter, the hydroquinone or pyro in the combination is of most importance. The foregoing would suggest an excess of metol in such combinations as are especially designed to be used for underexposures, otherwise an excess of hydroquinone or pyro should be used. The multiplying factor will vary accordingly.

Normal Exposures

Metol has been thought by many to be useless for normal exposures; this, of course, is a fallacy arising from its popularity as a reducer for underexposures.

Over-exposures For overexposures, metol, by itself, may be made effectual by using the two-solution formula above as advised under "directions for use;" but it were better to use metol in combination with hydroquinone or pyro, or to use hydroquinone or pyro alone.

Development of Positives The secret of obtaining rich, velvety blacks with the above formula on transparencies, lantern-slides and bromide papers is, not to dilute the developer to suit the exposure, but to use the developer constantly at full strength, altering the exposure to suit the developer. The fullest advice that can be given is to be found above under "Directions for Use." It has been found possible to use carbon velox with the above formula for such effects as are usually to be obtained with the "special" papers only.

Metol-Hydroquinone The Watkins factor for this combination is 13. *A.* Metol, 10 grains; hydroquinone, 20 grains; potassium metabisulphite, 10 grains; potassium bromide, 5 grains; water, 5 ounces. *B.* Sodium sulphite, desiccated, 120 grains (with the crystals 240 grains); sodium carbonate, desiccated, 100 grains (with crystals 240 grains); water, 5 ounces.

Hypo in the Developer The addition of from one to five drops of a 10 per cent solution of hypo-soda to each ounce of developer (in addition to the bromide of potassium called for in the above formula) retards development and keeps the shadows clear in case of overexposure. It should *not* be used in solutions prepared for the development of velox or bromide papers.

Potassium Bromide The quantity of potassium bromide required for some plates is very much in excess of that required for others. The quantity given in the above formula may be taken as the minimum.

Directions for Use The directions for quickly preparing the formula for metol apply with equal force in preparing metol-hydroquinone. The directions given above for the use of metol under

"Directions for Use," are applicable to the use of metol-hydroquinone with the following exception:

For "regular" Velox papers the above formula should be made up with 2 grains of potassium bromide instead of 5 grains in Solution *A*, which should then be combined with Solution *B* and used at full strength.

For "special" papers the solution made up for use with the "regular" papers is diluted for use with an equal quantity of water.

For bromide papers the solution advised for "special" Velox papers should be used, with the addition of a few drops per ounce of a 10 per cent solution of potassium bromide, if found necessary.

Nepera "M-Q"

It is presumed that for Velox and bromide papers the well-known "M-Q" formula of the Nepera tins and tubes—first given to the public through the writer some years ago—will be preferred. It is given below for the first time in the form in which I received it; beside the original metric weights will be found their equivalents. The Watkins factor is 10.

"M-Q" Formula

Metol, .75 gramme or say 12 grains; Hydroquinone, 3 grammes or 46 grains; sodium sulphite cp. desiccated, 12 grammes or 185 grains; sodium carbonate, cp. u.s.p. 20 grammes or 308 grains; potassium bromide, .25 gramme or 4 grains; water, 455 cc. to 570 cc. or 16 ounces to 20 ounces. I prefer to use 16 ounces of water and the following directions for use apply to a solution so made up.

For "regular" Velox papers use full strength. For "special" Velox and also for bromide papers, plates, transparencies and slides, dilute the solution with an equal quantity of water.

Compared with Other Developers

Metol-hydroquinone, or metol-quinol, familiarly known as "M-Q," is one of the most generally useful developers, or combination of developers, ever marketed, answering equally well for the development of dry plates, transparencies, slides, bromide and Velox papers. It is quite safe to say that all other developers could be dispensed with without serious loss if only this one remained. There are so many developers on the market that the full measure of usefulness of any one of them is but partly known. For instance, here is a combination of a "hard-working" and a "soft-working" reducer which by using an excess of metol or hydroquinone yields either soft or brilliant negatives, slides and prints, as may be desired, yet this, one of its chief merits, is seldom taken advantage of except when the developer is being prepared for general use, which is making the least use possible of the advantages it confers.

The color of the image yielded by metol-hydroquinone is generally of a bluish black. As with metol, density is lost in fixation, seemingly, however, not to the same degree.

Metol-hydroquinone gives greater density and is more amenable to control with potassium bromide than metol alone and is, therefore, better suited for over-exposures. It yields more pleasing tones and is easier to use with bromide and Velox papers than metol. One cannot excel with metol-hydroquinone the beautiful blue-blacks to be obtained on bromide and Velox papers with amidol, but it is more popular for use with these papers than amidol, because of the poor keeping qualities of the latter and its tendency to stain the whites of the print. With metol-hydroquinone a wider range of tones is obtainable in transparency and slide work than with metol alone. This developer keeps well and is stainless.

Metol-Pyro

The Watkins factor is 15. Prepare two solutions, as follows: *A*. Metol 10 grains; pyro, 20 grains; potassium metabisulphite, 10 grains; potassium bromide, 5 grains; water, 5 ounces. *B*. Sodium sulphite, desiccated, 120 grains (or crystals 240 grains); sodium carbonate, desiccated, 50 grains (or crystals 120 grains); water, 5 ounces.

Solution *A* will keep for months if properly bottled and tightly corked.

Directions for Use

The above may be quickly prepared as follows: Substitute 5 ounces of a 10 per cent solution of sodium sulphite crystals (hydrometer 28) for 5 ounces of water in solution *A*, and use 2½ ounces of a 10 per cent solution of sodium carbonate crystals (hydrometer 23) plus 2½ ounces of water, instead of Solution *B* as given above. *A* and *B* combined form a one-solution developer for normal exposures.

Potassium Bromide

The quantity of potassium bromide required for some plates is very much in excess of that required for others. The quantity given in the above formula may be taken as the minimum.

Compared with other Developers

This developer is suitable for use with plates only. The hints given for the use of metol for plates under "Directions for Use" are applicable to the use of metol-pyro. Metol-pyro is best likened to orto metol, pyro being added, as is ortol, to produce a developing agent giving greater density and more latitude in use. The color of the image it yields is of a warmer olive-black than that obtained with orto metol, and far excels in printing quality the blue-blacks of metol-hydroquinone, producing, in the writer's opinion, an ideal negative. This olive-black color may be varied at will by altering the proportions of sulphite and carbonate, but cannot be definitely controlled, the exposure given, especially if it be an overexposure, causing a decided change in the color as well as in the character of the negative.

This developer, when confined to the development of plates, may be said to possess the combined merits of every known developer, and the faults of metol and pyro, when used separately, i. e., poisoning very, very rarely, and staining very, very frequently, unless the proportion of sulphite per ounce of solution as above given remains constant—whether the developer be used at full strength or diluted—and an acid fixing bath be used. Staining of the hands is not so easily avoided.

Ortol

The Watkins factor for ortol is 10. Prepare the subjoined two solutions: *A*. Ortol, 30 grains; potassium metabisulphite, 10 grains; potassium bromide, 5 grains; water, 5 ounces. *B*. sodium sulphite, desiccated, 120 grains (or crystals, 240 grains); potassium carbonate, 60 grains, or substitute sodium carbonate, desiccated, 50 grains (or sodium carbonate crystals, 120 grains); water, 5 ounces.

Hypo in the Developer

The addition of from one to five drops of a 10 per cent solution of hypo-soda to each ounce of developer (in addition to the bromide of potassium called for in the above formula) retards development and keeps the shadows clear in case of overexposure. It should *not* be used in solutions prepared for the development of velox or bromide papers.

Potassium Bromide

The quantity of potassium bromide required for some plates is very much in excess of that required for others. The quantity given in the above formula may be taken as the minimum.

Directions for Use

The method of quickly preparing the metol-pyro already given, and directions for the use of metol under "Directions for Use" apply to this developer also—save in the case of bromide and Velox papers. For these take of *A* 1 ounce, *B* 1 ounce, water 1 to 2 ounces.

Compared with other Developers

Ortol is less liable to fog than metol, gives decidedly greater density and a better printing color—a brown-black. It is also more sensitive to additions of bromide of potassium to the developer, in which respect, as in most others, it bears a greater likeness to pyro than to metol. It is unlike pyro in that it keeps better and stains less—practically not at all in the presence of sufficient sulphite.

Ortol is well suited for the development of plates, whether normally exposed or under- or overexposed; also for the development of lantern slides and transparencies, giving good brown tones and clear slides; but for development of bromide and velox papers I cannot say that it is equal to M-Q in my experience.

The Watkins factor for this is 18.

Orto-Metol

Wenzel's revised formula is made up as follows: *A*. Ortol, 20 grains; metol, 10 grains; potassium metabisulphite, 10 grains; potassium bromide, 5 grains; water, 5 ounces. *B*. Sodium sulphite, desiccated, 120 grains (or crystals 240 grains);

potassium carbonate, 60 grains (or substitute sodium carbonate, desiccated, 50 grains, or sodium carbonate crystals, 120 grains); water, 5 ounces.

Hypo in the Developer

The addition of from one to five drops of a 10 per cent solution of hypo-soda to each ounce of developer (in addition to the bromide of potassium called for in the above formula) retards development and keeps the shadows clear in case of overexposure. It should *not* be used in solutions prepared for the development of velox or bromide papers.

Potassium Bromide

The quantity of potassium bromide required for some plates is very much in excess of that required for others. The quantity given in the above formula may be taken as the minimum.

Directions for Use

The directions for quickly preparing the formula for metol-pyro apply to this formula also. The directions given for the use of metol are applicable to the use of orto-metol, with the exception that bromide and velox papers the use of orto-metol is not advised, as better results are to be had with meto-hydroquinone.

Compared with other Developers

This combination of ortol and metol has all the merits of ortol with better keeping qualities, and derives from metol a tinge of its characteristic blue-black color, which, combined with the brown-black of ortol, results in olive-blacks, similar to those obtained with pyro-metol, but colder in tone. The keeping qualities of orto-metol, whether in two solutions or one, is remarkable. How long Solution A will keep, if properly bottled is not known at present; three years is not its limit.

BOOKS

The brochure on "Development" by Alfred Watkins, 1902, is the best work on the theory and practice of development at present obtainable. Price, 10 cents.

NOTES

In previous numbers of THE PHOTO-MINIATURE we have advised the use of Wynne's Exposure Meters as a handy guide to the determination of exposures indoors and out. This we have done because of our satisfaction in the use of the meter. There have been many complaints, however, about the inadequacy of the speed-list of American plates issued for use with the instrument. We now have pleasure in publishing a complete and thoroughly revised speed-list made by Mr. Henry Wenzel, Jr., together with a letter from Mr. Wenzel which speaks for itself.

SPEED-LIST OF AMERICAN PLATES FOR USE WITH WYNNE'S EXPOSURE METER

Revised to February, 1901, by Henry Wenzel, Jr.

American Plate F.	78
American Film	90
Carbutt's A. & Process	11
" B. 16	22
" B. 20	32
" Non-Halation D. C.	39
" Ortho Portrait S. 23.	39
" Negative Film	78
" Eclipse	78
" Eclipse Junior	90
" S. 27	90
Cramer's Non-Halation	45
" Slow Iso	45
" Contrast	64
" Anchor	64
" Banner	111
" Medium Iso	90
" Instant Iso	111
" Crown	128
Eastman Film and Plate	90
Forbes S. Plate	111
" S. Ortho	111
Hammer Slow	45
" Fast	78
" Extra Fast	111
Hammer Special Extra Fast Double coated F.	111
Lovell C. D. Slow	39
" C. D. Rapid	64
" Extra Rapid	128
" Extra Rapid, backed	128
New York Crescent Slow	32
" Non-Halation	39
" New Harvard Rapid	90
" Ortho	111
" Record Extra Rapid	128
Seed Process	16
" Non-Halation	111
" Ortho Landscape	111
" S. 23	78
" Negative Film S. 26	78
" S. 26	90
" S. 26x	111
" Portrait Ortho	111
" S. 27	128
" Gilt Edge	128
Standard Orthonon	111
" Imperial Portrait	128
" Extra	90
Stanley, S. 35	90
" S. 50	128

This list cancels all previously issued.

Editor The Photo-Miniature:

The speed-list I send you herewith is the latest and most complete, as well as the most accurate speed-list of American plates yet issued.

Watkins' new list (January, 1902), although it gives the speed ratings for less than two-thirds the plates listed above, is also to be commended as a great improvement on previous lists issued by Watkins.

There is hardly a grievous error to be found in either Wynne or Watkins' lists, and scarcely a single instance wherein they seriously disagree.

Such slight errors as may appear in the above Wynne list, if kindly brought to my notice, will be investigated and rectified. It may well be that any glaring error, if such there be, will be known and investigated, and perchance rectified and ready for publication before I am informed by others of its existence, but I shall welcome any correspondence in regard to the above speed-list. *I cannot answer correspondence in regard to the working of the meter, however, nor concerning the sensitive paper.* All I would say with regard to the latter follows:

Those finding the sensitive paper unduly slow in coloring to the standard tint may know that such paper has been over-dried, and may convert it into a paper of proper sensitiveness by simply holding the paper in the mouth and breathing strongly upon it, as one would an eyeglass prior to cleaning it. This little wrinkle will also prove a help to those who find trouble in matching the standard tint. From recent experience with a Watkins dial meter, I am in doubt whether this would not be a help to users of this meter also, as the sensitive discs in the dial meter took four times as long as they should to color, indicating some such trouble as that had with the Wynne sensitive paper. This will all be remedied shortly, I believe. Truly yours,

HENRY WENZEL, Jr.

237 South Fourth street, Brooklyn, N. Y.

❦

Mr. Charles H. Loeber, formerly of 12 East 17th street, New York, has removed to 15 East 17th street, just across the way from the old store. The new store and its roomy basement have been very attractively furnished to meet the requirements of Mr. Loeber's rapidly growing business in photographic supplies, picture framing, art reproductions and the like. A dark-room (or two) for customers has been provided, and the enlarging department is now one of the best equipped in the metropolis. Mr. Loeber has builded a large business by his industry and close attention to the desires of his customers, and we record this evidence of his success with much pleasure.

◆

The Anthony & Scovill Co., 124 Fifth avenue, New York, has opened a much needed department store for carbon printing for amateurs and the trade. The facilities of his department seem to be ample for all requirements and the prices are altogether reasonable for work of good quality.

◆

On January 28, Mr. Osborne I. Yellott, of Towson, Md., gave an admirable lecture on "A Plea for Rationalism in Photographic Controversies" before the Camera Club of New York. The lecture dealt with the various schools of opinion in pictorial photography, and was directed towards the moderation of the controversies which frequently agitate the discussion of this topic. Mr. Yellott was warmly received and spoke for nearly two hours, holding the attention of the large audience throughout.

◆

Messrs. Burke & James, Chicago, advise us that they have made arrangements with Mr. Ralph Martin, the well-known photographic chemist, whereby they will for the future manufacture and market his inventions. Among the new specialties already announced are "Soline," a sensitizing solution for printing on cloth, paper, post cards and other surfaces; "Microgen," a new developing agent for plates, films, lantern slides, transparencies and developing papers; the "Martin Silk Solutions," for printing on silk and satin; "Ingento," an acid hypo compound for plates and developing papers; and "Intensine," a crystalline mercuric-iodide compound for intensifying negatives and lantern slides.

A descriptive circular about these and other inventions by Mr. Martin, can be obtained from Messrs. Burke & James. It should be noted that these are not experimental novelties but products already favorably known and widely used for years past.

❧

The Brooklyn, N. Y., *Eagle* of January 18 contains an interesting column reviewing Mr. W. I. Scandlin's lecture on "Photography in New York Fifty Years Ago," delivered before the Institute of Arts and Sciences, January 17. Mr. Scandlin's lecture, which is one of unusual interest to those interested in photography and old New York, was illustrated with slides made from Victor Prevost's wax paper negatives made in New York, 1851–1854.

❧

The Gray-Lloyd Manufacturing Company, Ridgewood, N. J., send an interesting descriptive circular of their *Double Stigmats* *f*/5.6 and *f*/6.5. In addition to its information about this new anastigmat the circular gives net prices for direct purchase and should not be overlooked by those desiring a new lens for 1902.

❧

The annual catalogue and bargain list issued by the New York Camera Exchange, 114 Fulton St., New York, has reached us. It is a handy list of 64 pages, pocket size, conveniently arranged for ready reference, and abounding in bargains. For example: Lot 457: 1 pair 5-inch condensing lenses, not mounted. Price, $3.75. We have had a dozen inquiries for just this item within the last few months, and yet here it is at half the regular list price!

❧

In reply to several correspondents, we have ascertained that the Pratt Institute, of Brooklyn, N. Y., has not a photographic course. The catalogue of the Institute, giving its educational courses and terms, may be had by application to the secretary, Mr. Frederic B. Pratt, addressed in care of the Institute.

❧

Over in the beautiful little town of Alameda, California, lives a good friend of THE PHOTO-MINIATURE, Mr. Nelson C. Hawks—a pioneer type founder in days past, an enthusiastic amateur photographer, and owner of the California Camera Company. This company was, until recently, located in San Francisco, where it introduced the beautiful *Polychrome* printing paper and a famous developer aptly styled *The Heavenly Twins*. The office of the company is still maintained in San Francisco, but its headquarters have been moved to the home of Mr. Hawks at Alameda, across the bay from San Francisco. Mr. Hawks invites readers of THE PHOTO-MINIATURE journeying through California to pay him a visit, and this is his invitation:

"Take the Narrow Gauge Ferryboat at the foot of Market street, San Francisco, and in twenty minutes you are across, where a train waits on the right for Alameda. Take the train, and get off at Fifth street. My place is on Sixth street, corner of Haight avenue. A brown three-story Queen Anne house, with lawn and trees, and stable in rear of lot.

"This stable (which never had a horse in it) has been fitted up for the goods formerly kept in the city. Roses and climbing vines cover the sides, and the yard is full of tropical trees. The upper floor is converted into a gallery, with skylight, dark-room, backgrounds, screens, etc.

"Here is the quiet of the country within thirty-five minutes' ride from the city. The streets are like a floor, yards large, flowers and grass abundant, and sewerage the most perfect in the world. In many a lot the family cow grazes, and there are plenty of birds to liven things up. The train that brings you from the boat runs along the water edge all the way, so that my place is only three blocks from the bay.

"When you visit San Francisco take this little trip to Alameda. If you will 'look pleasant' I will present you with a negative of yourself, if you care for it, with the compliments of the house."

◆

Somewhat belated, but none the less interesting, comes Parsons' Xmas Annual, an illustrated year-book issued by Mr. Will Parsons, at Saint Johns, Newfoundland. It contains a few well-chosen holiday stories and several views of Newfoundland from photographs by S. H. Parsons and his sons. The Parsons series of Newfoundland views, by the way, is undoubtedly the most complete in existence, and covers every point of interest in the colony, with its life for over thirty years.

◆

The announcements of the American Aristotype Co. are notable among photographic advertisements for the amount of thought and individuality put into their preparation. This is seen in the announcement on our fourth cover page, wherein the growth of the Aristo bird is graphically displayed, as typical of the increasing popularity of the company's products. The steady growth of this enterprising firm has been clearly based on the merits of its manufactures, and the care with which they have fulfilled the requirements of the photographer in the way of printing papers.

◆

The value of the camera as an aid in education is very clearly set forth in the papers on "Photography and Education" appearing in the *Photo Era*, of Boston. The purpose of these articles is to show how photography can be applied in the teaching of English, geography, nature study, civics and similar studies. In the experiment detailed the children are in the ninth grade of a school which is on the border line between city and country, so that the pupils have access to green fields and crowded streets. The field of subjects for the illustration of studies is thus practically unlimited. The endeavor is, that every child shall have a camera, and the method is to photograph during the noon recess, the pictures being developed and printed at the school house after school hours, so that the whole course of photography is made by the children. So far the experiment has proved most successful. The studies are made more interesting, and therefore greater progress is made by each student.

The movement is one of great importance and promises much usefulness. We congratulate the editors of our contemporary on its successful inauguration. A circular describing the course and its procedure may be had on application from the Photo Era Publishing Co., Boston.

❧

The annual midwinter dinner of the New England Photographic Association, and the Lens & Brush Club of Boston, was held at the United States Hotel, Boston, January 17. About a hundred sat down to feast, and the affair was most successful. Among the guests of honor were the officers of the National Association: President Geo. M. Edmondson; Vice-Presidents Klein and Nussbaumer; Secretary C. R. Reeves, and Treasurer F. R. Barrows. Mr. Charles W. Hearn, as president of the N. E. P. A., acted as chairman, and Mr. H. A. Collings, of Holyoke, played the part of toastmaster.

The forthcoming convention of the P. A. of N. E., to be held at Copley Hall, Boston, August 20, 21 and 22, is already being planned, and promises to be a memorable meeting. Further particulars will be given later.

BOOKS AND PRINTS

Camera Shots at Big Game. By A. G. Wallihan. With an introduction by Theodore Roosevelt. 76 pp.; profusely illustrated with engravings and photogravures, 8 x 11 x 1 inch. $10 net. Doubleday, Page & Co., New York.

Having followed for several years the work of Mr. and Mrs. Wallihan in photographing big game in the west, we have unfeigned pleasure in recording the publication of this attractive memorial of their work. Few photographers have devoted so much love and persistent effort to their specialty as Mr. and Mrs. Wallihan have given to their peculiarly difficult and discouraging field. And, in spite of almost insuperable difficulties, their success has been remarkable, as the illustrations of this sumptuous volume amply demonstrate. The book teems with interest for all who love the wild life of which it tells, and the adventures so simply and yet so stirringly related make up a photographic story-book which should be prized by all earnest photographers.

The clever reproductions of Mr. Wallihan's photographs, as well as the introduction by President Roosevelt, give additional interest to the volume which is, in every way, a noteworthy contribution to the literature of photography and life out of doors. The book bears the imprint of the De Vinne Press and is tastefully presented.

❧

How to Cook Husbands is the title of a humorous little volume sent us by the Dodge Publishing Company, 40 West 13th street, New York. Price $1.

The volume has a special interest for photographers inasmuch as the publishers offer $100 for the best set of 8 or more photographs illustrating the points of the story, sent in to them before August 1, 1902.

After selecting the best set of pictures, the publishers will pay $5 for each picture desired outside of the prize set. A circular of particulars can be had from the publishers.

❧

Figaro Illustré, November, 1901. 75 cents. Brentanos, N. Y. This special issue of *Figaro* (French text) is wholly devoted to an illustrated review of the International Salon of Photography recently held at Paris under the auspices of the Photo Club. The front cover reproduces Demachy's now famous print, *Dans la coulisse*. Among the fifty-one pictures reproduced are examples of pictorial photography by prominent American, British, French, German, Austrian, Russian and Swiss workers. It is of interest to note that among the few full-page supplements place is given to a portrait of Viola Allen, by Mr. B. J. Falk, of New York.

The critique accompanying the pictures is unsigned. It deals in a broadly sympathetic way with the development of pictorial photography during these last few years, and forms an interesting contribution to the literature of this field.

◆

The McGinnis Method of Measuring Time Exposures is a four-page leaflet issued by James F. McGinnnis, of Mediapolis, Iowa. Price 67 cents. It purports to offer an original method of determining time exposures, and has apparently been worked out for use with Seed plates. Mr. McGinnis also publishes, at the modest price of 12 cents postfree, a full explanation of the *Chemistry of Development.*

◆

Little Journeys to the Homes of Eminent Artists. Written by Elbert Hubbard, and published by The Roycrofters, East Aurora, N. Y. Single numbers 25 cents. By the year, $3.

During 1902 this series will offer monographs on Raphael, Leonardo, Botticelli, Thorwaldsen, Gainsborough, Velasquez, Corot, Correggio, Horace Vernet, Paul Veronese, Cellini and Whistler.

◆

Masters in Art. A series of Illustrated Monographs giving careful reproductions from selected examples by various masters in art, with chosen opinions from authorities and critics. Published monthly at $1.50 per year. Bates and Guild Company, Boston.

We mention this series as one which readers of these pages will delight to know about. The illustrations are hardly capable of improvement, and the editorial selections from competent writers contain much useful information. Among the masters to be included in this year's issues are Perugino, Luini, Tintoretto, Giotti, Paul Potter, Turner and Hans Holbein.

The Photogram for Amateurs, published by Ward and Semmelmeyer, Chicago, is a dainty little quarterly which should not be overlooked by the intelligent amateur. The second issue, recently received, is largely devoted to the advantages of reading, and contains a list of books likely to aid the amateur in his difficulties. Among other features we note several pages of hints on every-day photographic manipulation, prepared with much more care and sense than is usually given to small items of the kind. Messrs. Ward and Semmelmeyer, whose business will undoubtedly profit by the publication of the magazine, have our congratulations on the real usefulness of their work. A copy may be had on request. *The Photogram for Amateurs* should not be confused with *The Photogram*, of London, with which it has no connection.

⁂

Among general magazines which should be seen by photographers first place must be given to *Country Life*, a monthly magazine published by Doubleday, Page & Co., of New York at 25 cents per copy.

The editor of *Country Life*, Mr. Liberty H. Bailey, is an enthusiastic believer in the mission of photography as an educator, and the camera plays an important part in the make-up of the magazine. The February number contains no less than ninety reproductions from photographs, in each of which, apart from their own peculiar interest, the camerist may find suggestions toward the improvement of his work out of doors. Among these illustrations we note pictures by Frederic Colburn Clarke, Grace Cook, J. Horace McFarland, F. A. Waugh, L. H. Bailey, A. Radclyffe Dugmore, Arthur Hewitt, W. C. Baker, Henry Troth, T. E. Marr and O. V. Lange.

⁂

Our exchanges indicate the prevalence of a "new cover" epidemic in the photographic field. Keeping to this side of the Atlantic, *Wilson's*, *Photo Beacon*, and *The Photo-Miniature* are apparently the only journals which have not indulged their fancies in this direction.

In England *Photography* has clothed itself in a new dress of quiet green, and the dear old *British Journal of Photography* displays its wisdom upon a cleaner and brighter paper than of old, wire-stitched—so that the reader cannot escape the interleaved advertisements. This latter device is perhaps the logical conclusion of an old-time journalistic bluff that "the advertisements in the B. J. are as interesting as the text pages."

❧

We have received from John Royle & Sons, Paterson, N. J., a very useful pocket calendar and diary for 1902, embellished with a few excellent maps, and containing much valuable information for daily reference. Process workers and engravers can obtain a copy by sending their cards to Messrs. Royle & Sons.

❧

The editor of THE PHOTO-MINIATURE has frequently been urged to undertake the occasional publication of a portfolio containing selected examples of pictorial photography, with a critical note or two about the pictures chosen for reproduction.

The idea has its attractive side, but THE PHOTO-MINIATURE alone brings its editor work sufficient for all his aspirations and abilities. Moreover, the thing proposed has already been attempted, and the experiment proceeds with considerable success. We refer, of course, to that delightful magazine, *The Photographic Art Journal*, for which Messrs. Quilter and Shardlow, of Leicester, England, are responsible. "The thousands of amateurs who," we are assured, "await the publication of such a portfolio," will do well to send 15 cents for a specimen copy of the P. A. J. to the American agents, Spon & Chamberlain, 12 Cortlandt street, New York.

The P. A. J. ends its first year with the February issue. It is a monthly journal, made up somewhat on American lines, with a page 6 x 10 inches, is printed on a desirable matt enamel paper, and offers some twenty half-tones, with just sufficient reading matter to interest without wearying the reader. The American who is exacting in the detail of typographical excellence should secure the *edition de luxe.*

⁂

Among the newest books, the following are all worthy the attention of our readers: *Elementary Telephotography*, cloth, by Ernest Marriage. 117 pp., illustrated, 5½ x 8½ x ½ in., $2.50. Chapters: I, Definitions; II, Telephotographic Lenses; III, Types of Lenses and work for which they are especially useful; IV, The Camera and its Accessories; V, General Applications of Telephotography; VI, Architecture; VII, Portraiture; VIII, The Telephotography of Animals; IX, Exposure and Development; X, Explanation of the Tables. Tables: 1. U. S. Numbers for *f*/1 to *f*/19. 2. Magnifications and Rapidity with Positive Lenses at F/3.16 and F/8 (English measure); 3, Magnifications (Metrical measure); 4, Rapidity with Positive Lenses at F/9. *Index.*

For those who have had an introduction to the field of telephotography such as is provided in the PHOTO-MINIATURE No. 26 or Messrs. Beck's *Practical Notes on Telephotography*, this manual provides an excellent guide to practical work. Mr. Marriage is thoroughly acquainted with his subject, and the book is marked by that thoroughness and directness which characterizes all the author's contributions to photographic literature.

Optical Lanterns and Accessories. Photographic Cameras and Accessories. These two little books, averaging 160 pages apiece, 4 x 6¾ inches, have been compiled, edited and rewritten from papers originally contributed to *Work*, an English journal. They offer much useful information, more especially profitable to British readers, concerning the making and handling of lanterns and cameras. The volumes are neatly bound in cloth. Price 50 cents each.

⁂

Photography for Naturalists. By Douglas English. 131 pp., illustrated. 6 x 9¼ x ½ inch, cloth, $1.75. *Chapters:* I. Introductory. II. Apparatus and Materials. III. The Photography of Mammals and Birds. IV. Reptiles. V. Fish. VI. Insects. VII. Pets and

Domestic Animals. VIII. Decorative Natural History Work. IX. Conclusion.

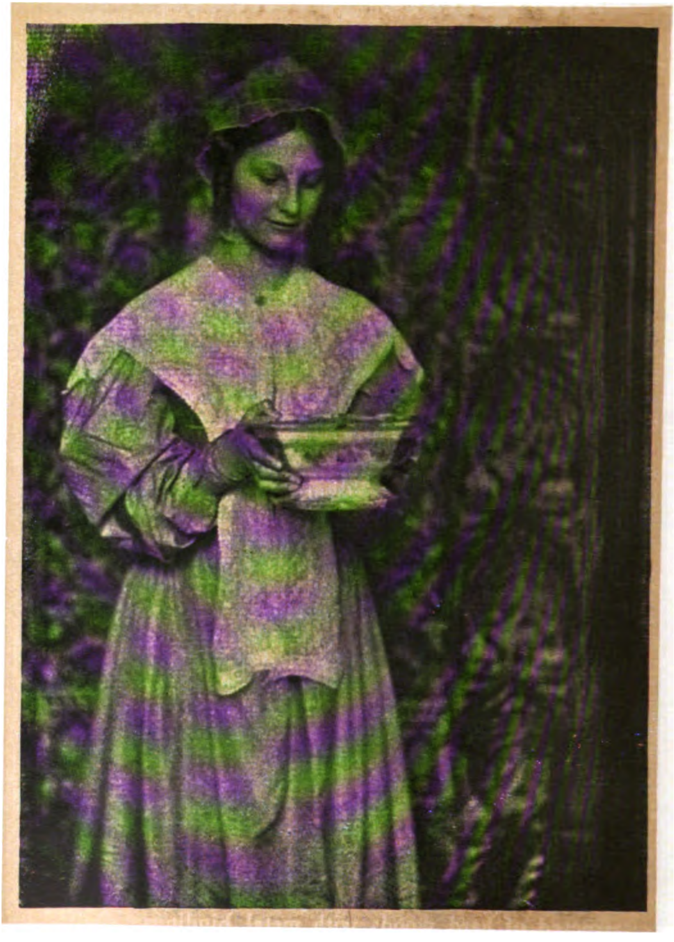
Mr. English has an enviable reputation in his specialty on the other side of the Atlantic, but his book fails to convince. The author frankly states that his work may be properly termed the "photography of natural objects 'by control.' Instead of the camera being approached to the object, the object is approached to the camera. . . . It is not the photography of 'Wild Life at Home,' but of wild life made to look at home and, in some instances, to feel at home. . . .

"In nearly every case the object photographed has been handled and has lived for a considerable time in captivity. In every case where it was necessary and possible, the object has been actually tamed. In no case has the natural habitat of the animal been focused and the animal waited on."

This, of course, is radically opposed in method to the work done on this side by Dugmore, Wallihan, and others, for which we confess our preference, judging from the results. A comparison of the third chapter of the volume with the story of "Two 'Possums and Several Mistakes," by Mr. Dugmore, in *Country Life* for February, will illustrate this preference. Nevertheless Mr. English gives us many useful hints, and displays a varied experience, which will be helpful to all who take up natural history work with a camera. The volume is well printed and attractively bound.

❦

The result of the $400 Prize Competition inaugurated last year by the *Photo-American* (Bible House, New York), is announced in the February number of that journal, received as we go to press. In this issue, also, the editor announces that his book, "How to Improve Bad Negatives," affording the reader a remedy for all the failures he has or will have, will be ready in April. We have also to thank the publishers of this journal for a bound volume of the *Photo-American* for 1901, which has already found place upon our bookshelf for reference.



LADY GLENMIRE ("Cranford")
Katharine S. Stanbery
Philadelphia Salon, 1901

The Photo-Miniature

A Magazine of Photographic Information

EDITED BY JOHN A. TENNANT

Volume III FEBRUARY, 1902 Number 35

ENLARGING NEGATIVES

To those who watch the evolution of photography the signs of the times are full of encouragement. On the one hand we see a steady growth of serious interest in photography's achievements and possibilities. Its applications in the sciences and industries are innumerable, widespread. The photograph has won its place as a work of art on the walls of the Paris *Salon*. On the other hand there is a persistent striving after directness and simplicity which argues most favorably for future progress. Year after year the journals, teeming with the experience of practical workers, display an unceasing endeavor to simplify the practice of photography; to make success more certain by the elimination of all inessential details from its methods and manipulation. Similarly, the trade catalogues of recent years reveal a strenuous effort to get rid of complicated parts and unnecessary bulk in apparatus; to simplify its operation while extending its capacity. The end of it all is plain. Photography must soon become in fact what it is destined to be: the world's hobby and the world's helper —universal in usefulness and pleasure-giving.

The elementary "fixed focus" camera, which serves for so many as the first step in photography, affords a ready instance of this tendency toward simplicity. A few years ago it was a cumbersome box, awkward in manipulation, abounding in limitations and disappointment. It seldom measured less than 9 x 5½ x 8½ inches and weighed about three pounds, being solidly constructed of hard woods with metal bindings. Its frequent use demanded the patience and courage of an enthusiast. The lens, with a working aperture of *f*/16 or *f*/20, required sunlight for the photography of movement, and was incapable of focusing upon the plate any object nearer than 15 or 20 feet away.

The "fixed focus" camera of to-day is quite another story. Its aluminum frame measures 1¾ x 3⅞ x 7¾ inches and is attached to a thin leather bellows so that it can be folded and carried in the pocket. It weighs 18 ounces, and permits the use of glass plates, flat films, or cartridge roll films at will. Its lens is an anastigmat mounted in aluminum, with a working aperture of *f*/6.3, which allows us to make successful instantaneous exposures even on dull days. The "fixed focus" feature of the instrument loses its normal limitations by an ingenious device permitting us to focus objects at varying distances from 9 feet to "infinity" by a turn of the lens mount. The manipulation of such a camera calls for so little personal trouble and inconvenience that my lady can carry and use it unconscious of encumbrance. And yet, so cleverly are these little instruments adjusted that we can assure ourselves of negatives which, apart from their small size, will equal the best of those made with old-style view cameras. I mention the instance merely to show the trend of progress. The same comparison might be applied with equal force to other branches of photographic activity. Compare the ozotype with the earlier methods of making prints in pigment; or the clumsy exposure shutters of a decade ago with the Sector of yesterday and the Volute of to-day.

Small Cameras are Popular

A direct result of this movement toward simplicity and convenience in modern photography is seen in the increasing popularity of small cameras. These do not, as some have vainly imagined, indicate a decadence of photography, but simply that we are at last arriving at the fact that the record is the end desired, the dimensions of the record being a secondary detail, Hence the use of plates larger than 5 x 7 inches is becoming comparatively uncommon except for professional or commercial purposes. It may in fact be said, without fear of contradiction, that fully 70 per cent of the plates and films exposed last year were for negatives 4 x 5 inches or smaller. It is equally safe to assert that this proportion will increase rather than diminish during future years. Reason, convenience and economy in working are alike in favor of the small rather than the large camera for a majority of uses.

Their Advantages

The practical advantages of the small camera being thus plainly acknowledged, it may seem superflous to go over them in detail. But for the doubting Thomas let us briefly run over some of the many reasons on which the general preference for the small camera is based. Briefly then, in portability, ease of manipulation and expense it lends itself to that general use of photography which best fills the desire of the average worker. When once the wonderful resources of photography are appreciated, its usefulness for pleasure or profit is seen to be well-nigh illimitable. The thousand and one things of which we desire a record—the chance occurrence, the passing incident at home or out-of-doors, the progress attained in some process of manufacture and the like—all are ours on the single condition that we have always a camera at hand ready for use. But the large camera is burdensome and, like most big undertakings, requires a certain amount of forethought and physical preparation. The opportunity passes without record. And it is ever the picture we could not get that haunts our dreams with its tantalizing beauty.

For Travelers

The argument applies with new emphasis to the case of the traveler. To him photography and its pleasures are naturally subordinate to the larger pleasure of seeing new places of interest. Baggage is troublesome and is invariably cut down to absolute necessities. Even a handbag is a nuisance during the ofttimes long days spent in and about foreign cities. The small camera which fits the hand or pocket, which we can readily forget save when in actual use, does not fall under this ban. We can use it a hundred times where the larger camera will be neglected to await a more convenient season. And its memoranda give abundant pleasures when the trip is long past.

And Others In the use of the camera for illustrative and industrial purposes the advantages naturally fall to the small instrument. Here photography is not the end, but simply a means to an end, something supplementary—as it is, in fact, everywhere save in professional practice. It will give us a detail in construction, or the ground-work for a sketch or design, or record a pose chiefly valuable as a suggestion for after-elaboration. In other words, photography is for many the best of all note-books or memoranda, and chiefly useful from that point of view. For this reason the beginner, the advanced worker in search of pictorial material, the student of nature and books, and the craftsman are unconsciously united in their preference for small cameras. In their use they offer all the advantages of photography, stripped of the difficulties and expense peculiar to the direct production of large negatives.

Expense: the Problem The question of expense, always important, will naturally demand particular attention as the use of photography becomes general. To the majority who use the camera as a means of pleasure, or in a way supplementary to their usual avocation, the detail of expense is continually forcing its way forward. Witness the common complaint that photography is a delightful but expensive hobby. This disability must be removed. It is probable that the simplifying of photographic methods will, in time, minimize the expense of failures resulting from lack of definite information in manipulation. It is not so certain that the cost of manufactured articles can be substantially reduced by an increased demand, inasmuch as their retailing will always involve the handling of small quantities. "Hypo" can be had in bulk for 2½ cents a pound, or less, but I have paid 15 cents for an odd pound at a Broadway store. The personal factor, responsible for much of the expense encountered in photography, is difficult to control.

Its Solution For the individual, however, a practical solution of many problems is found in a better appreciation of the real purpose and place of the negative in photography. When this is well considered the fact will be plain that the small camera, properly used, will meet all our reasonable requirements and, at the same time, keep the details of expense and lack of portability remote from interference with the free use of photography.

The Field of Discussion

Here we arrive at the purpose of this little book, which concerns the advantages of small negatives and practical methods for enlarging them when this is desirable. There is, as yet, no handbook dealing with the subject, and the time is ripe for its profitable discussion. To the victors belong the spoils.

The Negative: Its Purpose

The purpose of the photographic negative has been set forth time and again in these pages. It will bear repetition because of its practical bearing upon the question of enlarging. We are prone to forget that the negative is chiefly valuable as a means to an end; essential to the making of the positive record desired, but altogether subordinate to it in actual importance. Usually this positive record is a print on paper, made by direct contact with the negative. There are those who seem to have a fixed notion that the possibilities of a 4 x 5 negative begin and end in a print 4 x 5 inches or smaller. These vary their printing papers, and take pleasure in the different prints resulting from this variation. Variation in size does not seem to be considered. And yet in picture-making, as well as in the common-place record, size is an important item.

The advent of bromide paper opened up to many the possibility of obtaining large prints from small negatives. But, although undeserved, there is a widespread prejudice against the bromide paper enlargement. More especially to those enamoured of platinum and carbon prints the bromide print seems to lack quality, is coldly photographic, and its permanency is sometimes questioned. Then there are others who complain that the bromide enlargement has its limitations in tone or color. To these, as well as the merely curious, this monograph will appeal, as pointing out simple methods for making large negatives from small ones, from which enlarged negatives they may obtain film. Gently grasp film and glass support together, and withdraw them from the tray in such a way that the enlarged film adheres evenly and without wrinkle or bubble to the support. Drain off the surplus water, lay the plate on a few sheets of absorbent paper, cover with a sheet of oiled paper, and gently squeegee the film into perfect contact with its glass support, expelling surface water at every side. If this is skilfully done the film will adhere to its new support at every point, and there will be no air-bubbles or wrinkles visible to the eye. If these appear, gently smooth them out with a wetted finger tip, always working from the center to the edges of the plate. Now set the plate on edge to dry in a current of air free from dust. All this takes long to describe, but is ridiculously simple in operation. The secret of success is to remember the delicacy of the film and to handle it gently and patiently.

Simplifying the Method

In my rough-and-ready practice, almost invariably successful, I can enlarge and transfer a film in twenty minutes. But I dispense with the substratum, using simply glass plates thoroughly clean and devoid of grease or oiliness, and in place of squeegee and oiled paper, I use more care in lifting the film on its support from the tray, and rub it smoothly into contact with wetted finger tips. A few failures may be encountered in first attempts, resulting chiefly from blundersome handling; but very little experience will show the simplicity and practical usefulness of the process where only a moderate enlargement is desired.

Points to Remember

Two or three points should be mentioned. Negatives which have been forced in development, as the result of under-exposure, are sometimes more difficult to strip than under normal conditions, and the film will be somewhat "rotten," needing careful handling. Then the operation of stripping is easier after the use of some developers than after others. Pyro-soda and the modern developers offer no difficulties. As a certain amount of the density of the original negative is necessarily lost in the enlargement of the film, negatives to be enlarged in this way should be slightly over-developed;

or the enlarged negative may be intensified on its new support by any of the methods given in THE PHOTO-MINIATURE No. 15. A fully exposed and slightly over-developed negative gives the best enlargement by this method. As far as my experience goes, I have not noticed any loss of detail or any marked enlargement of the grain of the original image, although both findings are contrary to accepted theories. Another point worthy of mention is to see that the image is not reversed during the stripping. If the enlarged negative is to be printed in carbon, of course, this reversal of the film will be an advantage. This detail is very easily avoided or accomplished by attention in getting the enlarged film on to its new support.

Variations in Methods

There are several variants on this method as given. Thus hydrofluoric acid may be used in place of hydrochloric acid, and is preferred by many despite the difficulty of handling it. In using hydrofluoric acid we must remember that it is an acid corrosive, etching glass and porcelain, and forming dangerous sores if brought into contact with the fingers or skin. It is usually stored in rubber bottles. In dilute solutions it is comparatively harmless. Thus we will need a silver thimble, with a temporary long handle made of twisted wire in measuring out the quantities required for use, and gutta-percha trays, or glass or porcelain trays coated thoroughly with beeswax, for our manipulations. With these precautions, the following method is advised by Brown in *Finishing the Negative*. Immerse the unvarnished negative in a stripping and enlarging solution composed of: Hydrofluoric acid, ½ ounce; citric acid, 2 ounces; glycerine, ½ ounce; acetic acid, 2 ounces; water, 16 ounces. In this the film is released from its support and enlarged. When the film floats from its support give it a rinse in clear water and transfer to a perfectly clean glass plate of the required size.

Scolik advises hydrochloric acid solution 1:50, or hydrofluoric acid solution 1:40, for stripping baths. In the English market there is a special preparation, known as Cresco-Fylma, obtainable in powder form which, when dissolved in water, effects the stripping and enlargement of negative films. This is the simplest way of working the method above given. Cresco-Fylma solution No. 2 is especially prepared for use with film negatives, which are sometimes difficult to handle with the ordinary method. According to the Cresco-Fylma patent, the solution may be prepared of sodium fluoride, 1 part; citric acid, 9 parts; water, 56 parts. The degree of enlargement obtained depends upon the proportion of citric acid used. With the proportion given, the film expands to about double its original area.

Lurcock's Method

A process somewhat different from those already given was described by George Lurcock in the *Photographic News* some years ago. As I have had success with it I republish it for the help of those whose enlarged negatives lack density. Lurcock's method differs from other methods of a similar nature in the fact that the negative must be intensified *prior* to enlarging by means of a mercuric chloride intensifier. This is, I think, an advantage, as the after-intensification sometimes necessary in the other processes usually strikes one as tedious. The process presents no difficulties or risks to a careful worker. Briefly stated, it is as follows:

The negative, which has been previously bleached in the intensifier (mercuric chloride, 1 dram; ammonium chloride, 1 dram; water, 4 ounces), is, after rinsing, placed in a solution of hydrochloric acid 1 in 10, which has the effect of loosening the film from the glass support. This can be assisted by gently pushing back the film with a soft brush or with the finger. After again rinsing, the detached film is immersed in a solution of tannic acid, 1 in 20, contained in a large dish. The film is now observed to stretch itself out in a marvelous manner, and a great deal more detail will be observed in the image than was apparent in the smaller negative. The tannic acid solution is now carefully poured off, and the film rinsed in several changes of water, after which it is transferred into another dish containing the larger glass support, upon which it is carefully lifted out. The superfluous water is removed from its surface by means of blowing upon the film, and it is then set aside to dry. Care must be taken that no air-bubbles remain beneath its surface. When dry the image is blackened by immersion in weak ammoniacal solution (stronger ammonia water, 1 dram; water, 4 ounces). If the interference with the original negative is objected to, a positive made by contact upon a transparency plate can be treated in the foregoing manner, and the enlarged negative made from it, also by contact.

This process was discovered accidentally. Mr. Lurcock had stripped some mercury-bleached negatives in hydrochloric acid with the idea of *stiffening* the films with the tannic acid, and, instead of then becoming rigid, was greatly surprised to see them enlarging. The process will work with any negative or positive developed with any of the new developers, but with pyro-developed films it is not always satisfactory. I have obtained 5 x 7 enlargements from 4 x 5 negatives and have never had a failure. The beginner, however, should experiment with a soft, well-exposed negative or positive. Note: the tannic acid solution will *not* enlarge a film that has not been previously intensified by the method given above.

Vogel's Film Method

The processes described are advised for the enlargement of negatives made on glass plates. For film negatives the following method is given by Dr. Vogel: With a sharp knife the stratum of gelatine is cut through round the border, care being taken not to allow the knife to go quite through the celluloid or other support and the negative is then immersed in the following: Water, 12 ounces; caustic potash or caustic soda solution (1-3), 1 ounce; formalin, 5 minims. The negative is allowed to remain in the above liquid for five or ten minutes, when it is removed, without washing, to a bath composed of 20 ounces of water and 1 ounce of hydrochloric acid. In this bath the film will loosen, and when the cut edges show signs of rising, the gelatinous film is rolled up from one edge with the fingers. The gelatine pellicule is now mounted on a glass plate, either by squeegeeing or by drawing them out of the water together, and allowing them to dry in contact. A gelatinous substratum on the glass is desirable as securing permanent adhesion; the following mixture being recommended for coating the glass:—2 ounces of water, 3 grains of gelatine, and 10 minims of formalin. Dr. Vogel says that the process is so easy and certain that the loss of a negative is scarcely to be feared.

Disadvantages Enlarging by stripping the film has important disadvantages. The original negative, i. e., in its original condition, is necessarily sacrificed in obtaining the enlargement. The enlarged negative may be satisfactory, or it may not turn out quite successful, or there may be a slip in transferring or during the after-intensification; but the original negative we cannot have again. Then there is always a certain element of uncertainty and risk in working with a thin gelatine film which has already been subjected to chemical processes. And, finally, the degree of enlargement possible is limited. We will rarely get an enlarged negative more than double the area of the original. For these reasons, perhaps, the film-enlarging methods have not been generally employed, although deserving a wider use than they have at present.

Methods Generally Used The processes now to be considered are those generally employed in the enlargement of negatives. They are very similar to the methods used in making bromide enlargements, and those familiar with enlarging on bromide paper will have little difficulty in adapting their apparatus and manipulation to the making of enlarged negatives. As far as apparatus is concerned, we can use a simple "fixed focus" enlarging box, an enlarging camera or lantern, or a room fitted for enlarging or bromide work. These arrangements cover working by daylight or artificial light, the choice being determined by circumstances or personal convenience.

The chief point of difference between enlarging negatives and making bromide enlargements is that in the latter case we work direct from the negative itself, whereas in enlarging a negative we require, first of all, a positive or transparency from the original negative, using the positive for the production of the enlarged negative. This essential feature of negative enlarging enables us to choose between two methods. We can make a small transparency by direct contact exposure with the original negative, and obtain our enlarged negative from that; or we can make an enlarged transparency of the size desired, and obtain our enlarged negative by direct contact exposure with this enlarged positive. There is considerable difference of opinion as to which is the best of these two methods, but both will be described and the reader can make choice for himself between the two.

Negatives for Enlarging

Since the quality of the enlarged negative will depend on the quality of the transparency from which it is made, special care should be given to the production of the original negative when enlargement is desirable. On this point W. H. Sampson says: The ideal negative for enlarging purposes is a little different from that which will be best suited for printing by any of the ordinary methods, so much so, indeed, that the better it is suited for enlarging, the less likely would prints from it by any of these methods be to please the picture-maker. It should be sharp all over, full of delicate detail, and as true in values as it is possible by photography to make it. Orthochromatic plates and a suitable color screen should be employed for such subjects as require them. True values, or correct gradation from the most delicate detail in the shadows up to the highest light, is the most important feature, and the better that gradation is the more perfect will be the resulting enlargement. This will be readily understood.

Exposure

The negative must be one that for printing would be called thin, not be dense in any part except in the highest lights, and of these there are very few in nature—in landscapes generally none at all. In other words, no part of a negative suitable for enlarging should be quite opaque, and none should be so dark that the illuminant employed for enlarging cannot penetrate it without doing too much at the other end of the scale. To secure this is mainly a question of exposure and, to a less degree, one of development. The exposure must be such as to impress the weakest parts of the subject—those that will form the faintest details in the shadows—sufficiently for them to be reduced by the developer before the action of the latter has been more than enough on the gradations nearest to the very highest lights. That is, the exposure must be such that in development the weakest detail in the shadows must be out before the half-lights and those above them are rendered opaque, or would print white. So much, indeed, depends on getting a correct exposure that, especially as small plates cost but little, it is well to make several exposures, varying both above and below what is considered the right thing, or what a trustworthy exposure meter suggests as correct.

Development

Much will also depend on the development. It is well known that a solution strong in reducer tends to give density rapidly, and this, as has been said, is to be avoided. In developing negatives for enlargement, the strength of the developer may be reduced to about one-half prescribed in the ordinary formula, and the bromide altogether omitted. The following may be suggested as suitable:

Ortol, 20 grains; potassium metabisulphite, 10 grains; sodium carbonate, 200 grains; sodium sulphite, 200 grains; water, 10 ounces.

Instead of modifying the developer to suit the exposure, this should be stuck to, and the exposure made to suit it. In this solution, on a properly exposed plate, the highest lights of the image will first appear, followed almost immediately by those a shade lower, and so on, down to the most delicate detail in the shadows. The true test of correct exposure is that the shadows appear before the former become opaque, or even too dark, for the enlarging light to penetrate them. If the higher lights—the sky and anything in the subject not absolutely white—become opaque before the detail in the shadows appears, the exposure has been too short, and the operator must try again, as, although such negatives may be made to give fairly good prints in the usual way, enlargements from them would be hard—"soot and chalky."

If, on the other hand, the lower lights follow the higher too rapidly, and an examination by transmitted light shows all the lights to be about alike translucent, the enlargement will be wanting in contrast—flat, stale, and unprofitable—because the exposure has been too long. The remedy is obvious.

The Transparency

We must now decide whether to use a small transparency and enlarge from that, or whether we will make an enlarged transparency and produce our enlarged negative by contact from that. Giving the first method precedence, let us see how best to make the small transparency. Some workers advocate the use of an ordinary dry-plate or a transparency plate for making the contact transparency. This is a simple expedient and, with care, will give good results. It is best to use a slow, fine-grained plate for this purpose, keeping the transparency soft and thin in character, with abundant detail. Knowing that the least speck of dust or flaw in the negative will appear in the transparency, great care should be exercised to avoid these. The negative should be thoroughly cleaned on both sides, and the transparency after exposure should be developed and handled with care to the same end, all defects in this being painfully evident in the enlarged negative.

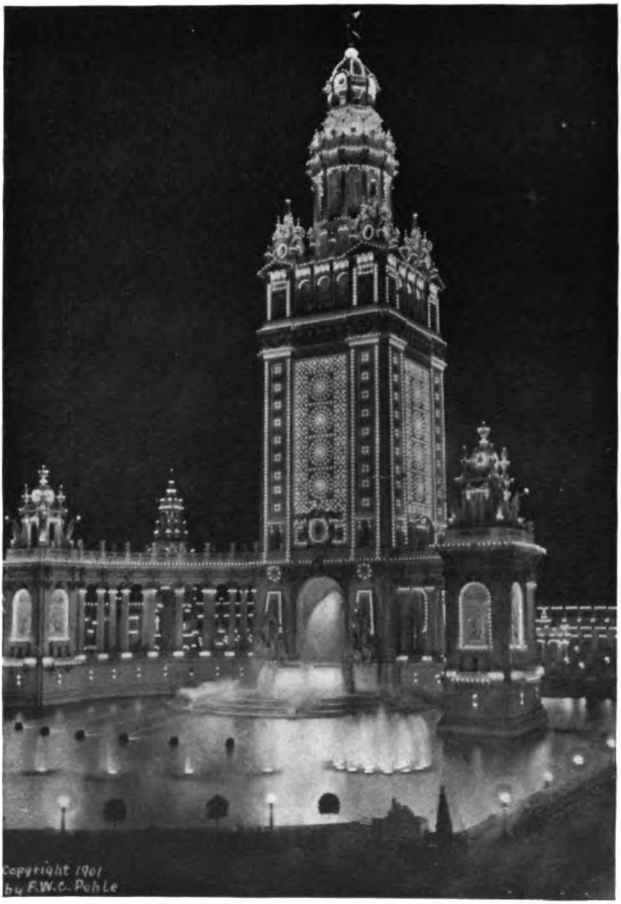
How to Make It

The manner of making the contact positive is as follows: Having carefully studied the character of the negative—its unevenness, its color—carefully clean the back, and place in a deep printing frame, a size larger than the negative, having in it a thin plate-glass free from bubbles and scratches. Now, in the dark-room well sheltered from all light arrange the negative in the center of the plate-glass in the frame, brushing away all grit or dust with a soft blender, and place the plate face down in contact with the negative, using a dark, soft pad between it and the back, which must be gently pressed into position.

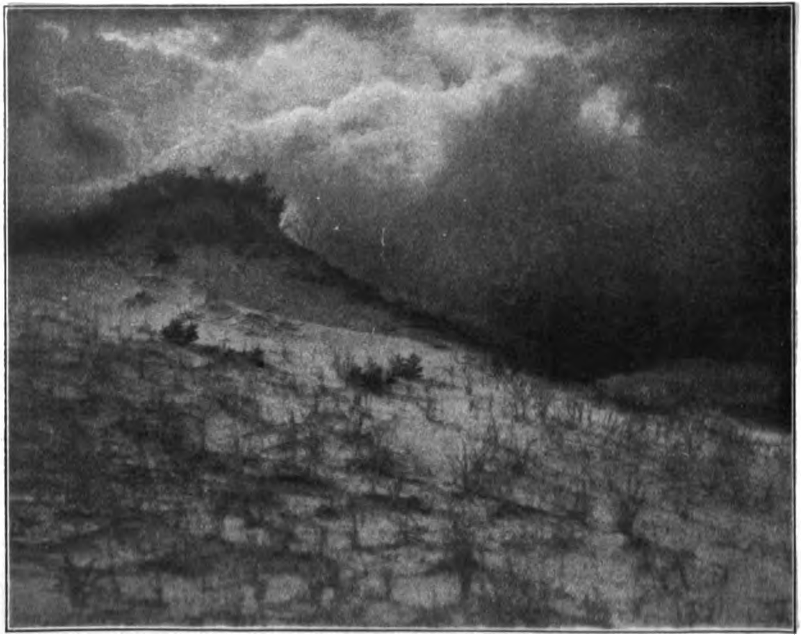
The printing frame used should be one which will give a strong and perfectly even pressure so that the negative and unexposed plate are in absolute contact. We are now ready for the exposure. For this artificial light is best as simplest and most easily controllable. An ordinary oil lamp, gas jet, incandescent gas, or incandescent electric lamp of 16 or 32 candle power will give satisfaction. To obviate the possibility of light reaching the unexposed plate from behind the frame, the illuminant used should be enclosed in a box or lantern having an opening or exposing door. Most dark-room lamps, such as Carbutt's Multum in Parvo lamp, have this feature. The printing frame is placed opposite and parallel with the light. With a plate of medium rapidity, and an average negative, placed 2 feet from a No. 6 gas burner, the exposure should be about 15 to 20 seconds. With a rapid plate at the same distance away 8 or 10 seconds may suffice. It is apparent that the exposure must be a matter of experiment or experience, depending on the density of the negative, the strength of the light, the speed of the plate, and the distance between light and negative. During the exposure, dodging may be resorted to—such as shading thin places or prolonging the exposure in dense portions by moving in front of the subject a card with hole, moving this so that no sharp outline may result.

Some prefer using a plate a size larger than the negative in order to get a more even positive. I quote Mr. Sampson: What has been said in regard to the exposure and development of the negative applies equally to that of the positive. The ortol developer before given will answer equally well for the positive, but with twelve or fifteen ounces of water instead of ten, and the exposure must be made to suit it, instead of the developer being modified to suit the exposure.

A good positive for enlargement differs considerably from a good lantern-slide. It should include every trace of detail that is in the negative, and no part, except the very highest of high lights, should be clear glass—that is, every gradation below the very deepest possible shadow should be sufficiently translucent for at least some light to pass. But even with the most careful exposure and development it is always possible to improve the transparency by one who knows what he wants and how to get it. Notwithstanding all his care, the values may be more or less at fault—a foreground too weak, or a sky too strong, and these faults



ELECTRICAL TOWER, PAN-AMERICAN EXPOSITION
Copyright, 1901, by F. W. C. Pohle



DIES IRAE
Yarnall Abbott

may be remedied, the one by a wash of suitable color, the other by a touch of some of the well-known reducers. A little "Agfa," say, in one cup, and a little of the permanganate reducer in another, with a couple of brushes or tufts of cotton, and a skilled photographer, can work wonders.

Carbon Transparencies are Best

The most desirable transparencies for enlarging, however, are those made by the carbon process. As printing in carbon is daily becoming more popular, the method of making carbon transparencies followed by Mr. Sampson is given. The transparency tissue mentioned is obtainable from dealers who supply the ordinary tissues. Transparency tissue differs from the ordinary tissue in containing a larger quantity of pigment, much finer ground, and should always be used for transparency making.

The first step in printing is to sensitize the tissue. To do this cut the tissue to a size a shade smaller than the glass, dust it on both sides, and slip it face upwards into a tray about two-thirds full of the sensitizing solution described below, passing the fingers all round, so as to secure complete immersion. After about a minute turn it over, going all round it in the same way. As soon as it lies quite flat, the sensitizing may be considered complete. Take it out by drawing it across the edge of the tray to remove as much of the solution as possible, and squeegee it on to a plate of glass a little larger than itself, to get rid still further of the superfluous solution. Remove it from the glass and clip it up to dry. Drying should take place in a dry, airy room, as the quicker it dries the better it will be. The sensitizing solution may be as follows: Potassium bichromate, 144 grains; liquid ammonia, 12 minims; alcohol, 2 drachms; water, 10 ounces.

Up to this stage the operation may be performed in dull diffused light, as the tissue is not sensitive while wet, but the drying must take place in the dark or in a non-actinic light. Although sensitized tissue with proper precautions will keep good for several weeks, it is better to use it within a few days—so only as much as will be used in that time should be sensitized at once.

Printing and Development The printing is conducted in the ordinary way, except that a frame with strong springs, or, better still, one with screws, should be selected, as considerable pressure is required to bring the hard tissue into close contact with the negative. As there is no visible image exposure is generally regulated by an actinometer, but in the absence of that a negative of about the same density may be printed under a piece of printing-out paper, side by side with the carbon print, and when it is a little more than sufficiently printed the transparency will be about right. It is easier than it seems, and a few experiments will give confidence. It will be found that a transparency requires about half as long again as an ordinary carbon print.

As development is conducted on the glass that is to be the permanent support of the transparency, it should be selected with care. It must be free from bubbles, scratches, or imperfections of any kind, quite flat, and as nearly as possible chemically clean. It will be found advisable to immerse the glass in a solution made up by dissolving ten grains of gelatine to each ounce of water, and adding enough potassium bichromate to give it a distinct yellow color. The glass is then dried in daylight. This insures against any washing up of the image. Slip the printed tissue under cold water, just as was done for sensitizing, and pass the fingers all round, turning it as soon as it begins to get limp. When it is quite limp, turn it again face downwards and pass the glass under it so as to withdraw them together, free from included air-bubbles. Squeegee them in the usual way to secure perfect contact, and cover them with a plate of glass and a weight of a pound or two. Treat as many as have been printed in the same way, and after ten or twenty minutes, development may be proceeded with, and in the full daylight.

Importance of Correct Exposure Development is purely a mechanical process, a washing away of the unacted-on gelatine and the pigment it contains, and its success depends entirely upon whether the exposure has been approximately correct. Experienced photographers may develop prints together, but the beginner had better do them separately.

A kettle with boiling water should be at hand, and a thermometer is almost a necessity. About half fill the tray with water at a temperature of about 100° F., and immerse the glass bearing the print face upwards, rocking the tray the while. If the exposure has been about right, the black gelatinous mass in a few minutes will begin to ooze out at the edges. The paper backing may then be taken by one corner and slowly drawn off, leaving a glutinous mass all over the surface of the glass. If the rocking motion is kept up this will gradually disappear, giving place to the details of the picture, and if the exposure has been right, a few changes of water at the same temperature will leave nothing but the picture in all the beauty of perfect detail, and in every degree of gradation that was in the original negative.

Improving the Transparency

If the exposure has been too short, the picture will be weak, without detail, the more delicate shades having been washed away. For that there is no remedy. Too long an exposure gives a dark image equally lacking in detail; this can be overcome by the application of warmer water, if not too much overdone. In such a case remove the print and add from the kettle sufficient water to bring it up to about 130° F., and probably all will go well. Should local or partial development be necessary, it may be accomplished by placing the print face upwards on a sheet of glass, and with water at about that temperature (130°), pouring it in a stream, on such parts as it is desired to lighten, from a pitcher or vessel with a spout. The developed print is then immersed in a saturated solution of alum, and after washing in several changes of water, it may be set up to dry.

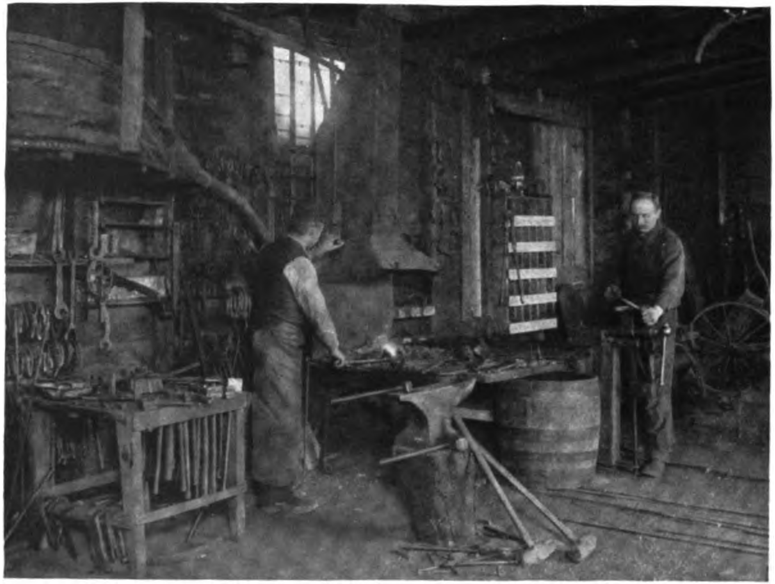
While this simple outline of the process may be sufficient for some, success depends on so many little wrinkles that those who want to adopt it should study a manual of the process or read THE PHOTO-MINIATURE No. 17, devoted to carbon printing.

Having obtained a suitable small transparency by one or another of the methods outlined, it should be carefully examined and all spots, defects or blemishes skilfully removed or remedied by the use of pencil, brush or knife. Extreme delicacy of handling is essential here, as every mark made on the transparency is necessarily enlarged and emphasized in enlarging. A retouching outfit will be most useful, and a little practice will quickly make us expert in such work as may be required. It is obvious that at this stage, as in earlier stages of making the transparency, there is abundant scope for modifying details in the subject or softening obtrusive features in the original negative.

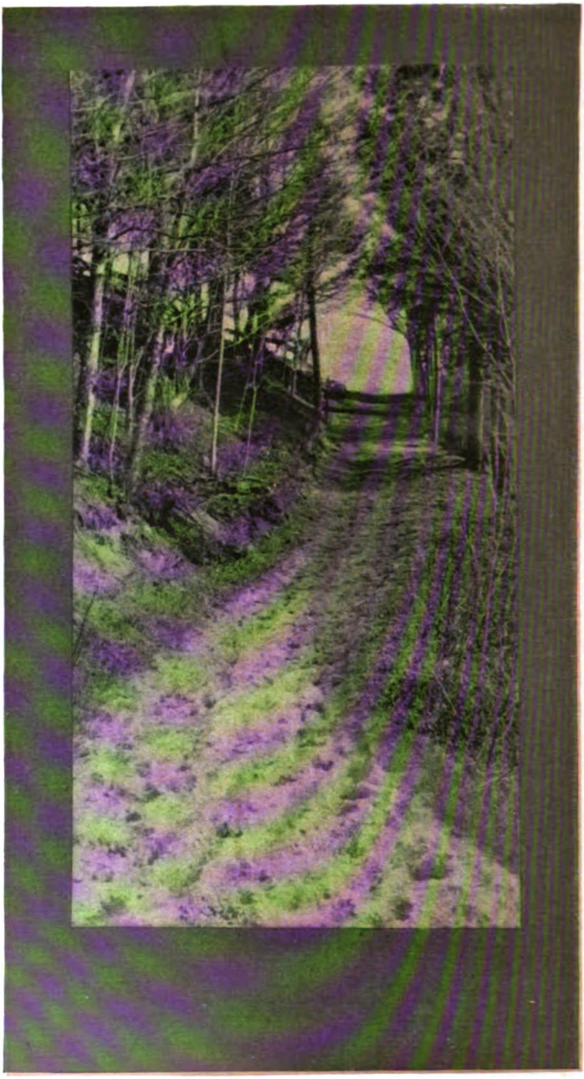
We are now ready to discuss the actual operation of enlarging. The methods to be given apply equally to making an enlarged negative from a small transparency, or to making an enlarged transparency from the original negative. In the first case we get the enlarged negative direct by enlargement; in the second we get the enlarged negative by contact from the enlarged transparency. The principal advantage of the latter or indirect method is that the large transparency permits of many modifications and much handwork, such as retouching, impossible in small transparencies.

A Simple Enlarging Box For those who confine themselves to negatives of one size, say 4 x 5 or less, and can content themselves with enlargements uniform in size, say 10 x 12 inches, the easiest method of enlarging is the use of a simple enlarging box. This, within the limitations mentioned, will serve as an enlarging camera, and can be made at home or by a local carpenter at a slight cost. The dimensions of the box will be governed by the size of the enlarged negatives desired, and the focal length of the lens used. The lens used to make the original negative will answer all our purposes, so that there is no expense attached to this item. For the best results, however, a lens capable of covering a plate one size larger than the negative to be enlarged, such as a 5 x 7 lens for a negative 4 x5, should be employed. Mr. Sampson describes how he made such a box, for 10 x 12 enlargements from 4 x 5 transparencies, as follows:

Supposing the lens to have an equivalent focus of 8 inches, the positive will require to be about 10¼



Henry Wenzel, Jr.



A PASTURE ROAD
Frederick B. Hodges

inches in front of the lens, and the plate about 32 inches behind it. We need, therefore, a deal box of such a size, with a groove at one end that will exactly fit a 10 x 12 dark slide—this latter we had better buy than try to make—and about 45 inches in length. The box should be closed on all four sides and one end, but in the latter a small opening must be made the size of the transparency, provided with grooves at the top and bottom, into which it will slide. About a third from the closed end and on the top, a door should be cut and hinged, to give access to a lens-carrying board, for the reception of which three or four grooves should be cut, the middle one being at such a distance as will place the focal center of the lens 10¾ inches from the transparency.

Whoever makes the box will easily make a frame for a focusing screen in perfect register with the plate in the plateholder, and with that the enlarging box will be complete. Even although it may not be light-tight at the hinged door or elsewhere, the focusing cloth thrown over it will make it so.

Using the Box

The apparatus so arranged with the end holding the transparency forward may be placed on a table near a window with a reflector outside in the ordinary way, or it may be placed at an angle so as to face the sky, which is perhaps the better way, and will entail a shorter exposure.

In enlarging, focusing is an important operation, and must be done with the greatest possible accuracy. For this purpose it will be an advantage to focus the image in air rather than on the rough surface of the ground-glass. For this a disc of thin glass, such as is used for microscopic cover glasses, should be cemented with Canada balsam in the center of the focusing glass, and the image focused by a pocket magnifier or one of the focusing glasses made for that purpose.

The Plate

A plate of medium sensitiveness on the slow rather than on the fast side should be chosen. Great care must be given to secure a correct exposure, as on that more than on anything else depends the success of the operation. As a timekeeper nothing is so good as a pendulum—a stone at the end of a string 39½ inches long swings practically in a second. As the exact exposure will be a matter of experiment, a carrier in the large plate-holder for a small plate will save the cost of a big one for a trial. Just what stop to employ must also be a question of experiment. One after another should be tried, and that which gives equality of illumination and the nearest to crispness all over should be used. With the lens I generally employ *f/22* answers admirably.

The bane of an enlargement is usually its hardness—a want of the more delicate detail between the lights and the darks—arising, when the positive was as it should be, from an exposure insufficient to penetrate its translucent parts. The remedy is to give sufficient exposure to do so. With everything so arranged, and the exposure made, all is plain sailing.

Individual or Special Requirements

From this description the reader can readily construct an enlarging box adapted to the usual size of his negatives and the degree of enlargement desired. The length of the box will depend on the focal length of his lens, inasmuch as this regulates the distances required between lens and transparency and lens and plate. The subjoined table will be useful to those who have not at hand the tables for enlarging given in the year-books and in THE PHOTO-MINIATURE No. 1. It was given in the *Photo-Beacon*, and serves for the short focus lenses largely used in hand cameras.

FOCUS OF LENS	TIMES OF ENLARGEMENTS		
	2	3	4
	Inches	Inches	Inches
3 inches................	9 4½	12 4	15 3¾
4 inches................	12 6	16 5⅓	20 5
5 inches................	15 7½	20 6⅔	25 6¼
6 inches................	18 9	24 8	30 7½
7 inches................	21 10½	28 9⅓	35 8¾

The upper of the two figures given in each case is the distance from lens to plate, and the lower figure the distance from lens to transparency.

The second table will be useful to those who work the English sizes and desire to enlarge from ¼-plate to 12 x 15 with intermediate sizes.

Table for Enlarging Quarter Plate to

Focus of Lens	Half-Plate	Whole-Plate	8 x 10	10 x 12	12 x 15
Inches	Inches	Inches	Inches	Inches	Inches
4	10.2	12.2	13.75	15.7	18.8
	6.5	5.9	5.65	5.35	5.1
4½	11.5	13.75	15.5	17.73	21.1
	7.35	6.65	6.35	6	5.75
5	12.8	15.25	17.2	19.7	23.5
	8.2	7.4	7.1	6.7	6.4
5¼	13.4	16	18	20.5	24.6
	8.6	7.75	7.4	7	6.7
5½	14.1	16.8	19	21.6	25.79
	9	8.15	7.8	7.35	7.5

The larger figures give the distance between the lens and the plate, the smaller figures between the transparency and lens. Allowance has been made in calculating the appended table for a margin round all plates of one-eighth inch.

The commercial enlarging cameras or lanterns, obtainable from most dealers, are of course more convenient and more desirable than these home-made appliances for those who can afford them. Among those in the market the *Ideal Enlarger*, the *Folmer Enlarging Camera*, the *R. O. Co.'s Enlarger*, and Anthony's *Enlarging Camera* may be mentioned.

Where a separate room can be given up to enlarging, whether permanently or only occasionally, a much more satisfactory arrangement can be made available. With such a room and a few pieces of home-made apparatus we can enlarge by daylight or artificial light as desired. I quote the admirable plan given by Mr. Yellott in THE PHOTO-MINIATURE No. 16:

Daylight Enlarging

We will first consider enlarging by daylight. For this purpose a room with at least one window will be needed. It should preferably be convenient to the dark-room. If the window of this room commands a view unobstructed by buildings, trees or the like, so much the better. I personally prefer a south light. With this one can get soft enlargements from contrasty transparencies, while by shielding the positive from the direct rays of the sun we can work from positives which are quite flat and lacking in contrasts.

The Enlarging Room

But whatever the room chosen, all windows but the one at which we are to work must be blocked up. This can be done by heavy dark curtains, or by specially constructed frames covered with light-tight material, and made to fit closely in the windows. If there are any transoms, these should likewise be covered. White light entering under the doors can be shut out by placing a rug along the bottom of the door. Care must be taken that the window-frames fit closely, as there must be no light whatever in the room save that coming through the positive at the window opening. This is simply a matter of careful blocking out of all light save as indicated.

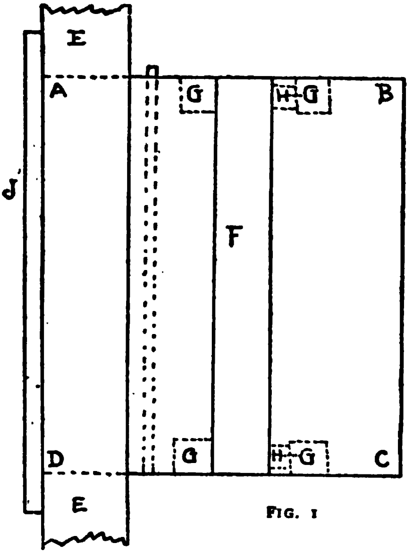


FIG. 1

Apparatus

Assuming that the room chosen can be made practically light-tight, we will need some arrangement to hold the positive. The details of a box for this purpose can best be shown by a diagram (Fig. 1). ABCD is a strong and neatly made box open at both ends, and about two inches larger each way than the largest positive from which enlargements are to be made. E represents a section of a board which forms part of a window frame, a general view of which is given in Fig. 2. Reverting to Fig. 1, F is an opening cut in the side of the positive box two inches or a little less from the back of the box, AD, and wide enough to admit the free passage of the positive in a kit or other holder. On the inside of the box are tacked strips, GGGG, to serve as a guide to the kit when placing it in the box. An opening similar to F should be made in the other side of the box to permit lateral adjustments when we come to use the apparatus, besides enabling us to put the positive in or withdraw it from either side. A convenient modification of the strips, G, is found by placing the front ones a short distance further forward, to wit, toward BC, as they are shown in the cut (Fig. 1), and tacking to them a piece of watch-spring, H, this then serving both as a guide and as a means of pressing the kit or transparency holder against the other strips, GG (Fig. 3).

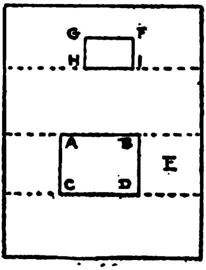


FIG. 2

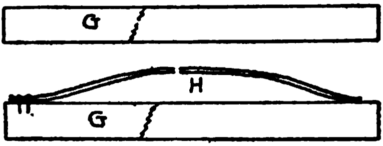


FIG. 3

J is a sheet of ground-glass, which is tacked over the opening when the box is firmly set in the board, E. It is well to have this ground-glass fixed in place so that it can be readily removed if desired.

The necessity of having the box at least two inches larger each way than the largest positive from which enlargements are to be made is shown in Fig. 4. Here AB represents the positive in place, CA, DB and EG represent rays of light entering the box. It will be seen that the rays CA and DB strike the ground-glass at an angle, but nevertheless at an angle which results in their passing through it in a considerable degree. They strike the positive AB, but if the positive were the full size of the box, to wit FG, it will be seen that while the section AB would be fully lighted, the sections AF and BG would receive no oblique rays at all, and hence the positive would not be even approximately uniformly lighted. This point is too often overlooked in the construction of apparatus of this character, but is necessary in all cases of daylight enlarging and especially when direct sunlight is used. Now with the positive box in place, some arrangement must be made for holding the lens, which can be the lens used for making the negative. This for enlargements of a fixed size from positives of a given size can be accomplished by simply extending the section BGGC Fig. 1, to a proper distance and placing the lens in the end of it; but this permits too little opportunity for adjustments and is not advisable. A double box, one sliding within the other would be better, but still not quite satisfactory. It is far better to adapt one's camera to the apparatus, and this can always be done; it being very simple with a reversible back camera, which can be backed right up to the opening, and more difficult but always possible with others. Fig. 5 shows the entire apparatus in place, and the manner in which it is used. AB is the window board, C is the positive box, D is the camera adjusted to the latter, E is the enlarging screen on an easel fitted to receive the plate, and F is the reflector. The screen on the easel can be made either to rest on the floor or on a table. It can be made to run on a track or other-

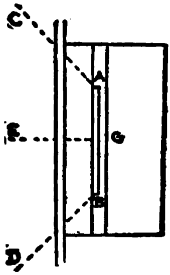


FIG. 4

wise, and it can also be made so as to admit of either vertical or lateral adjustment or both, or it can be nothing more than an ordinary box set on a table. But however constructed it must be considerably larger than the largest plate which is to be used, thus allowing for nearly all necessary adjustment. A sheet of white cardboard of the thickness of the average plate should be provided, to fit in the grooves where the sensitive plate will rest, in order to permit of focusing the enlarged image. The reflector F is considerably larger than the transparency box, and adjusted at an angle which will reflect the light from the sky or sun evenly upon the ground-glass. It is best covered with good white blotting paper. G is a hood which I have found useful in sunlight enlarging, especially in summer when the sun is almost overhead. It is placed on the outside of the window-frame, some distance above the ground-glass, and shields the latter from the direct rays of the sun, which would otherwise cause uneven illumination owing to their too great obliquity. The direct sun on the white reflector will give a light of high intensity. In winter, however, when the sun is low, it will fall directly on the ground-glass, and this, if the positive box be constructed as advised, is not objectionable, but on the contrary an advantage. In Fig. 2 the opening, FGHI, represents a sheet of ruby glass, and can be screened while focusing if found to interfere with the worker's convenience in that operation.

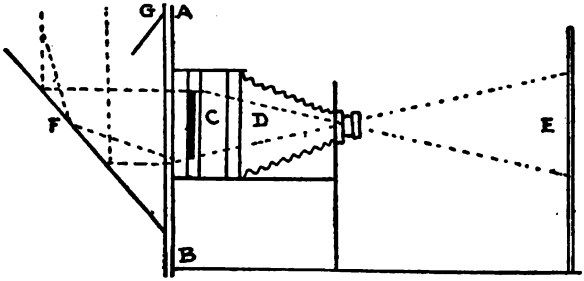


FIG. 5

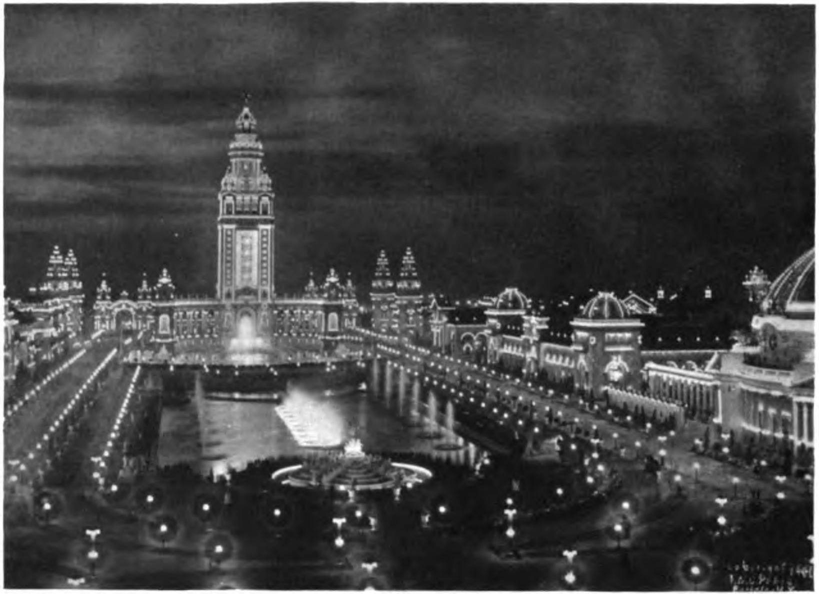
Modifications

The apparatus as sketched will suffice for all ordinary work. Modifications of it will depend upon the ingenuity of the man who attempts to design or construct one. It should be noted that the distance of the ground-glass from the positive has its influence in the strength of the light, and it is better to have this distance not over two inches. If less than one inch, however, the diffusion of light is not so good. When the light is weak the ground-glass can be removed entirely; the transparency will thus be viewed directly against the white reflector. Very strong positives giving undue contrasts may also be dealt with in this way. Or, if the light is too strong for flat positives, the reflector can be removed entirely, or to the same end a sheet of yellow glass can be substituted for the ground-glass, thus increasing contrasts. In fact, a very useful and easily arranged modification of the positive-box consists of an opening in the top of the box inside the room through which can be dropped an extra sheet of ground-glass or opal to cut down the light, or of yellow glass to increase contrast.

I have referred to a kit as being the proper arrangement for holding the positive. This, after much tribulation in working with home-made contrivances, I have found to be the best arrangement. They come a size or two larger than the positive with which they are to be used, and can easily be cut down to the proper dimensions. With it, also, other kits to hold smaller positives can readily be used. It is also simple with them to fasten the positive in place. If they extend beyond the box on either side so much the better; greater lateral adjustment can then be made. The positive box, Fig. 1, is best painted dead black inside in the section GBCG, and white in the section AGGD. The reasons for this will be obvious at a glance.

Enlarging with Artificial Light

The apparatus for enlarging with artificial light is, as has been stated, more expensive than that for use with daylight. The positive box and screen, however, remain as given. But we need, in addition, two extra pieces—a light-box and a pair of condensing lenses.



THE COURT OF HONOR, PAN-AMERICAN EXPOSITION
Copyright, 1901, by F. W. C. Pohle

PAN-AMERICAN EXPOSITION
Copyright, 1901, by F. W. C. Pohle

The form of light-box presupposes the choice of illuminant, and in this there is a wide range. Suffice it to say that a kerosene lamp with one or more one-and-a-half inch burners will be found suitable for very small work or weak transparencies. For larger work or stronger transparencies a stronger light will be needed.

The Light

The electric arc-light and lime-light may be put aside as rarely available for amateurs. After these come acetylene, a gas giving an intense light of high actinic power. This is within the reach of nearly all, as a first-class generator costs only about twelve dollars, and the uses of the gas are manifold. The same generators and burners can be used with a projecting lantern and will be found far more satisfactory than oil. Acetylene burners can be had in various sizes, ranging in power from thirty to several hundred candle-power. The carbide from which the gas is generated is not expensive and costs only a few cents each time the machine is loaded. By an adjustment attached to the generator the gas is kept at a constant pressure, and hence the light is unusually steady. All in all this light has many advantages. After it in strength comes the Welsbach burner, suitable for those having gas in the house. After this comes the ordinary gas-burner, and then oil. The reader, knowing now what will be required of his light, can take his choice.

The Light-Box

Perhaps the simplest form of light-box is where the light is placed in one room and the enlarging done in an adjoining one, the light being admitted through a suitable opening. This prevents any stray light reaching the sensitive plate and is productive of no additional heat in a room presumably already hot enough.

If this is not feasible a light-box must be constructed. As these vary so much in material and design, and must be altered with different forms of light in use, I will merely state the requirements. First of these is that it must be light-tight; and second, that it must have adequate ventilation and be fire-proof. Following these in importance, there should be a simple arrangement for looking at the light from time to time to see that it is burning properly and some means for readily attending to it if it is not.

Having the light-box, the burners must be placed in it properly. Here the shortest way out of the difficulty is to go to an expert. If electricity is used go to an electrical supply house; if gas, go to a gas-fitter. As will be seen later the flame itself must be placed in a certain relation to other portions of the apparatus, and provision must be made accordingly.

The Condensers

In looking over the magazines and annuals we will now and then see some new method given for illuminating evenly the back of a negative in enlarging or reduction. The most of these the writer has tried, but he has never found one of them which could be relied upon to give even reasonable satisfaction. If the light is apparently evenly diffused it is too weak. If strong enough it is not evenly diffused. Hence I will recommend nothing short of a pair of condensing lenses, as these have been proved by experience to be satisfactory in every respect if properly handled and cared for. The diameter of these must be slightly greater than the diagonal of the largest positive from which enlargements are to be made. These can be bought in pairs, mounted or unmounted, at about the following prices:

Diameter Inches	Focus Inches	Pair of Lenses Mounted	Per Single Lens Unmounted
4	5½ or 6½	$4.00	$1.25
4½	5½ or 6½	6.00	1.50
5	6½	7.50	1.75
6	8	12.00	3.00
8	12	32.00	7.50
9	14	40.00	10.00

The prices asked for condensers vary considerably in different price-lists. In Britain the cost of condensers will range from one-third to one-half less than the prices here given from an American list.

Mounting the Condensers

If it is desired to save the additional cost of the mounted condensing lenses, they can be comparatively easily mounted by anyone at all familiar with tools in the following manner:

A piece of quarter-inch pine or poplar is cut to a square about an inch larger than the diameter of the lenses. In the center of this is sawed out a circular opening the exact size of the lens. In another board of the same dimensions is cut a circle a quarter of an inch less in diameter. The boards are placed together with the grain rnnning in opposite directions, to prevent warping, and the lens kept in place by a wire bent in a circle and clamped in place so as to hold the lens, or other similar arrangement. See Fig. 6. The other lens is mounted in the same way. The two are mounted with their convex sides facing each other and a slight distance apart. It is better to place between them a thin sheet of finely ground glass, as this overcomes the bad effects of slight flaws in the lenses, which are not uncommon. The combination is then boxed up and is ready for practical work.

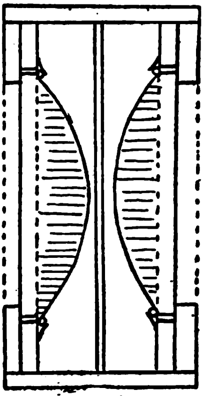


FIG. 6

Having now our light-box, condensers, positive box, camera and screen, they are next arranged in the order shown by Fig. 7. A long table especially constructed for the purpose makes the best base for this purpose.

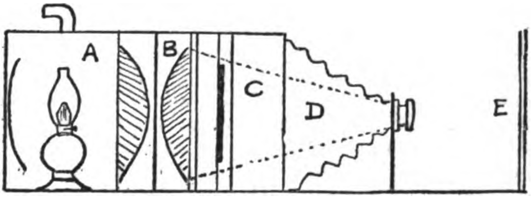


FIG 7

In putting the apparatus together there are several points to be noticed: First, the planes of the lenses, positive, projecting lenses and screen must all be parallel; second, the centers of all these should be in a single straight line, and third, either the light or the condensers should be mounted so as to easily slide backward or forward, since every time the projecting lens is racked backward or forward it necessitates a corresponding motion of the condenser to or from the light.

In constructing the apparatus, for use with condensers and artificial light, the same provision should be made in the positive box for inserting a piece of colored or ground glass as was made in the daylight apparatus. When the diameter of the condensers is but little greater than the diagonal of the positive it will be necessary to have the latter quite close to the former, as the cone of light from the condensers has its apex at the lens, and hence if the positive in such a case is at a distance from the condensers the corners will receive no light. Reference to Fig. 7 will show this plainly. For this and other reasons it is always best to have the condensers of ample size for a given positive. In fact, before beginning to make enlargements the worker should work with one good positive until he finds out exactly what light-intensity is best suited to it. This will then serve as a standard for all other positives of the same general grade, and variations of the light can be made as required for particular positives, or where the extent of enlargement is materially changed for various purposes.

Enlargement Tables

In using the daylight apparatus, which we will now consider, the positive is placed in the holder opposite the center of the ground-glass, upside down and facing into the work room. The room is darkened and lens uncapped. An image more or less blurred will appear on the focusing screen. If the enlarged negative is to be only slightly larger than the original, the lens must be racked out until its distance from the positive is but little less than its distance from the screen. To make the enlargement greater we simply rack back the lens and move the screen further off. The tables given on a previous page may be utilized to ascertain the required distances between the lens and positive, and lens and plate for enlargements of any given size.

Tables for enlargements of from one to twenty-five times, with lenses varying in focal length from five to twenty-five inches, can be found in the annuals. A convenient tables is also given in THE PHOTO-MINIATURE, No. 1: *Modern Lenses.* In practice it is convenient, after having once found the focus for a given enlargement from a given positive with the lens in use, to mark on the base of the apparatus the point to which the lens has been extended. Then in making future enlargements of the same size, it is only necessary to set the lens at that point and move the easel backward or forward until an approximate focus is obtained, when the image will be of the proper size on the focusing screen.

As an approximate guide it is sufficient to know that the nearer the lens is to the positive the greater will be the enlargement, as may be seen in Fig. 5. If a piece of glass or an old negative cut to the exact size of the enlargement desired and covered with white paper is placed upon the easel-screen, little difficulty will be experienced in getting an enlarged image of the proper size and correctly focused.

Focusing

It is advisable to focus the enlargement with the largest aperture of the lens. If the lens, when working at its largest aperture, covers the plate from which the enlargement is being made, it will give proper definition over the enlargement. With a lens of the better sort, of course, the definition will be equally good whether a large or small aperture is used; but with a low-priced lens it is better to stop down to No. 8 (*f*/11.3) or No. 16 (*f*/16), to avoid spherical aberration. Stopping the lens down increases the time of exposure, and enables one to have greater control over the exposure, permitting time to shade or locally increase the exposure at any portion of the image. This is sometimes useful, but as a general thing stopping the lens down is not advisable, as interfering with one's judgment in calculating exposures for various positives. Having secured the image correct in size and focus, adjust the lens stop as desired and cap the lens, leaving the room totally dark save for such safe light as we may have for working.

Place the sensitive plate in its grooves on the screen and we are ready for the exposure.

Making the Exposure

In making his first enlargements, the beginner should avail himself of the help of test-plates of smaller size. These should be of the same rapidity as the plate on which the enlargement is to be made, and can be held in a kit or carried sliding into the groove used for the focusing screen and plate. The exposure depends on a number of factors, among which are light, positive, focal length of lens, size of enlargement, stops, sensitiveness of plate, developer, temperature of developer, and length of development. A few test-exposures will quickly enable one to judge of the correct time required.

After a while one gets the ability to determine the approximate exposure required by looking at the enlarged image on the screen, correcting slight errors by length of development, and greater ones by modifying the developer by diluting or strengthening. It should be remembered, however, that in judging exposure by reference to the screen, we must consider the high lights, as well as the shadows. It is in the high lights that we need the detail if we are to have soft negatives. If this detail in the high lights is plentiful and clear we may know that our light is strong enough for a very short exposure. If it is very faint, we will have to give a long exposure and use diluted developer to save the over-exposed shadows. On the other hand, if the image on the screen is a flat one, we may know that our light is too strong for the positive, and it must be modified by removing the reflector or by interposing ground or yellow glass; and if neither of these suffice, we can simply lay the transparency aside for a dark day when the light will be weaker and more favorable.

In the use of artificial light we are guided by the same general principles as in daylight enlarging. When the reader has gained a little experience in the adjustment of his apparatus, the modifications in manipulation called for by different classes of transparencies, the individual requirements of his subjects, and in making his exposures, the after-treatment of the enlarged image will not present any difficulty. The enlarged negatives, like all other negatives, can be modified and improved in development by all the arts and dodges used in the dark-room by skilful workers.

Making an Enlarged Positive

In following these methods to produce an enlarged transparency of course the reader must insert the word "negative" wherever the word *positive* or *transparency* occurs in the description, since in this method we use the original small negative to produce the enlarged transparency.

Where an enlarged positive is made the plate can be manipulated to any extent before the enlarged negative is made by contact. The making of an enlarged negative from this positive does not call for description, the operation being precisely similar to the making of contact bromide or Velox prints, except that a glass plate is used instead of the bromide or Velox paper in the ordinary printing frame, and that a negative is obtained instead of a positive print. An exposure of about 5 to 15 seconds at three feet away from an ordinary gas jet will usually give a good negative from an enlarged transparency of average density.

Nothing has been said about the use of negative papers instead of glass plates for enlarged negatives. It is obvious that these papers offer decided advantages in the details of expense, convenience of handling and general manipulation. But I am convinced that the reader is fully awake to these advantages and will substitute paper for plate wherever it is desirable for his purposes. Enlarged negatives made in this way will necessarily show a slight grain due to the paper. This is not generally regarded as a disadvantage in large pictures, but can be easily overcome by oiling and waxing the large negative according to the instructions usually accompanying negative papers. The negative papers made by the Rotograph Company, and those made by Wellington & Ward are excellent for this purpose. Apart from minor details, i. e., the differences resulting from the use of paper instead of glass plates, the differences in sensitiveness and the like, their manipulation does not differ from that required in making enlarged negatives on glass plates.

Enlarging from Large Negatives Sometimes it is desirable to enlarge from negatives larger than 5 x 7; as, for instance, to enlarge a 6½ x 8½ inch negative to 16 x 20, or 18 x 24 inches. To avoid the expensive and bulky apparatus required to handle such large originals it is advised that a small transparency be made from the original negative by reduction, as in making lantern-slides. From this small transparency the enlarged negative can be produced in the apparatus already described.

BOOKS

Practical Enlarging. By John A. Hodges. 4th edition, 1900. 138 pp., illustrated. (English) 50 cents.

Photographic Enlargements. How to make them. By G. H. Wheeler. 7th edition, 1902. 130 pp. Paper covers, 50 cents.

Both these books deal with enlarging on paper for the most part, but contain much valuable information applicable to negative enlargements.

NOTES

Among recent events of more than ordinary interest the admission of photographs to the Paris *Salon* is easily first. The news of this remarkable achievement, remarkable because of the prejudice against the claims of photography as a fine art among painters, was given in the New York *Herald* a few weeks ago. The honor was awarded to a collection of photographs submitted by Mr. Eduard J. Steichen, a Milwaukee amateur, who is at present studying art in the Paris studios. It is peculiarly gratifying to record that this long-coveted distinction has been secured by an American worker in pictorial photography.

Since the *Herald* dispatch was published we have seen a statement that Mr. S. L. Stein, a professional photographer in Milwaukee, had also had several photographs accepted by the *Salon* judges.

❧

At the National Arts Club, New York, March 5 to 22, there was held an exhibition of American Pictorial Photography arranged by "The Photo-Secession." The exhibition, comprising 162 pictures, was one of rare interest, and covered the development of modern pictorial photography in America more completely than any similar show we have seen. The prints were chosen from the pictures representing the United States at the International Exhibition of the Fine Arts, Glasgow, 1901, the Photographic *Salon* at Paris, 1901, and the exhibition by the "Secession" painters at Munich.

We are not informed concerning the make-up and purpose of "The Photo-Secession" which, in this exhibition, introduced itself to public attention, but we believe that it is an organization including those workers in pictorial photography who were dissatisfied with the management of the Philadelphia Photographic

Salon of 1901. The "Secession" movement is headed by Mr. Alfred Stieglitz, who invites the curious to inquire of him concerning the "Secessionists" at 3 West 29th Street, New York.

❧

Mr. Juan C. Abel, one of the editors of "Camera Notes" and librarian of the New York Camera Club, is contributing to the *Delineator* a series of cleverly written and beautifully illustrated papers on "Pictorial Photography."

❧

The camera manufacturers have surpassed themselves this year in the preparation of their catalogues announcing the new season's goods. Those interested in the evolution of the camera should not neglect to get these little announcements and study their contents. Most dealers have stocks of those hereafter mentioned.

The Eastman Kodak Company's 1902 catalogue is remarkable for its beauty apart from the interest of its information. It is a book of sixty-four pages, 5½ x 8 inches, tastefully printed and illustrated. The cover has a stamped design in green and gold, showing a sturdy oak springing from acorns in which are enfolded Cartridge Roll Films. This, of course, symbolizes the growth of the kodak idea — simplicity in photography. The new goods must be seen in detail to be properly appreciated, but we may mention the new Folding Pocket Kodak de Luxe; a beautiful Stereo Kodak listed at the surprisingly low figure of $15; an addition to the Brownie series, titled No. 2 Brownie; and a tiny No. 0 F. P. K. listed at $6. This latter will undoubtedly prove popular as a memorandum camera.

The catalogue is one which cannot be adequately described in a paragraph. Those who secure a copy will be repaid in pleasure for the trouble involved.

From the Rochester Optical and Camera Supply Company, Rochester, N. Y., comes a bundle of handsome catalogues and booklets, full of delightfully alluring things. This house, in itself a combination of several large concerns, has taken a new lease on life and is making a specialty of plate cameras of every size and style, for all classes of work, and adapted to all purposes. Some of these instruments will be noted at greater detail in our next issue. Meanwhile, we hope our readers will secure copies for themselves as altogether more satisfactory than second-hand description. Requests to the manufacturers, as above, for copies of the Premo catalogue, the List of 1902 Pocos, the Booklet of the Pocket Poco (a wonderful little camera for plates or films at $9), and the Treatise on Picture-Making, will bring copies to any address if THE PHOTO-MINIATURE is mentioned.

◆

We note with pleasure that the sterling little book on "Negative Making," published for free distribution by the Hammer Dry Plate Company, St. Louis, has reached its *sixth edition*. Every amateur should possess this pocket reference book. A postal to the manufacturers will bring it.

◆

Townsend's excellent little volume, "Chemistry for Photographers," has reached its third edition, in which several changes and improvements are evident. This book, which retails at 50 cents, is perhaps the simplest and most satisfactory introduction to the general chemistry of photography at present available. [Tennant & Ward, New York.]

◆

Abney's "Treatise on Photography," thoroughly revised, with numerous additions, makes its appearance in its tenth edition. This book, which is devoted chiefly to the theoretical side of photography and its processes, has for many years been regarded as an authoritative text-book of photography. The price of the work has been changed from $1.25 to $1.75.

◆

"The Photographic Dealer's Annual" for 1902 (an English publication) is announced as ready for delivery. American dealers would do well to get and read this valuable year-book. It can be obtained with a yearly subscription to that enterprising monthly, "The Photographic Dealer," by sending an international post-office money order for $1 to "The Photographic Dealer," Harp alley, Farringdon street, London E. C. As this offer is open to legitimate dealers only, those subscribing must enclose their business card.

⁂

Apart from the Card Index System, the neatest and most systematic method of recording negatives which we have yet seen is that introduced by Mr. S. T. Simmonds, of Newark, N. J. Those interested in the orderly arrangement of their negatives should write Mr. Simmonds for a detailed description of his "Record." Perhaps a better plan would be to send 25 cents for "Record No. 1," a convenient demonstration of the value of his system.

⁂

A practical and instructive little book on "Practical Chemistry" has just been published for free distribution by the Standard Dry Plate Company, Lewiston, Maine. The text of the booklet was prepared by Mr. Milton B. Punnett, the chemist of the S. D. P. Co., and deserves praise for its directness and happy arrangement.

⁂

According to a report in *Photographisches Wochenblatt* the photographic export trade of Germany amounts to over $2,500,000 yearly, which sum represents about half the entire photographic output of the empire.

⁂

Mr. John Werge, one of the oldest photographers living in England, writes to the *British Journal of Photography* as follows concerning "the first photograph of the human face" referred to on page 379 of our November issue:

A friend has forwarded to me a newspaper cutting relative to the first Daguerreotype taken in the United States, which is anything but correct. I do not know the source of the cutting, but I give it verbatim:—

"The death is reported from Hastings-on-Hudson, United States—of the first person who ever sat for a photograph. This Miss Draper, an old lady, of 95 years of age, was a sister of Dr. John Draper, the discoverer of the process of making the Daguerreotypes in a few minutes. A great sensation was caused in artistic sets in 1839 by the picture of 'Dolly Draper,' with the startling information that the subject only sat for about six minutes. This original picture is now in the possession of the descendants of Lord Hershel, who became its owner at the time."

Now, *imprimus*, admitting the statement to be true, that Dr. John W. Draper did make the first Daguerreotype portrait in the United States, it is equally true that he employed the iodine process, simply as published by Daguerre in 1839, and never employed a chemical accelerator at all in 1839. What he did do was to whiten the faces of his sitters, which would undoubtedly shorten the time of exposure; but the process, if that term can be employed, was neither artistic nor scientific. There was no chemical accelerator employed in any part of the world until Mr. Goddard employed the vapour of bromine along with that of iodine in 1840, and this converted the surface of the silver plate into a bromo-iodide of silver, which at once reduced the time of exposure from minutes to seconds, and when Mr. Bingham introduced his bromide of lime accelerator the time of exposure was still more reduced, so that instantaneous Daguerreotypes were produced long before the process became extinct. Having disposed of the chemical and scientific errors of the paragraph, I next go into the possession of the picture referred to. It never was, nor is, in the possession of the family of Lord Hershel. It was sent to Sir John Herschel by Dr. Draper, and, to prove my statement, I will make a few extracts from his son's letter to me, dated March 27, 1893, and he says: "Professor Draper sent my father, Sir John, a Daguerreotype, taken by himself, before the 28th of July, 1840, and that is still in my possession, and is to go to Chicago for exhibition there. The interest of it scientifically, is that it is certainly the first of his that was sent to England, and was found then to be, in Sir John's opinion, by far the most satisfactory he had seen. This, I think, shows that there were others already in England. I shall be glad to show you this one when it returns from America some day.—Yours very faithfully, W. J. Herschel."—I remain, yours truly, JOHN WERGE.

❧

An exhibition of American products and manufactures is to be held at the Crystal Palace, London, during May. The exhibits are divided into 11 classes, "Musical, optical and photographic instruments," comprising class 8. Why cannot we have in New York or other large city, an exhibition of photographic apparatus comprising the instruments and conveniences used by amateurs and professionals in various branches of photography? There can be no doubt about the popularity of such an exhibition, or of its educational influence in promoting the more general use of photography as a helper in many industries.

❧

An open competition for amateur and professional photographers is announced in a recent issue of *Figaro Illustré*, Paris, with a prize of 1000 francs for the best and most artistic, original portrait of a woman. Each competitor may send in as many prints and negatives as he or she may please. The packages must bear a pseudonym, which is to be placed upon an envelope containing the name and address of the sender, but only one print will be selected by the jury from any competitor's work. The twenty-four prints which are adjudged to be the best by the jury will be published in the *Figaro Illustré* between March and November. In the December number a voting paper will be given, which each reader may fill up and return to the editor. The jury will count the votes and award the prize of 1000 francs to the person who has the greatest number. The names of the winner and other competitors will be published in January, 1903, and the pictures will then be returned to their respective owners. Requests for particulars should be addressed to Goupil & Co., 170 Fifth avenue, New York.

A new method of producing carbon prints by double transfer, with a matt surface similar to that of a photogravure, is announced by Illingworth and Co., L't'd., Willesden Junction, London. The process is very similar to the ordinary process of making carbon prints, but requires the special "gravure" tissue and supplies manufactured by Illingworth. At present only three tints, special X, resembling sepia photogravures, red chalk and sepia, are obtainable. There has long been a demand for such a method among pictorial workers in photography, and we trust the supplies will soon be obtainable from American dealers.

❧

An international exhibition of philosophical, electrical and photographic apparatus will be held at Lille, France, from May to September. It is hoped that the collection of instruments displayed will show the progress of modern invention in these sciences. The secretary of the exhibition may be addressed at 35 Rue Nationale, Lille.

❧

One hears comparatively little of the progress of the acetylene industry on this side of the Atlantic, or of the use of the new gas for home or industrial purposes. In England there is being formed an acetylene association for "the advancement of acetylene gas engineering and manufacture, and to facilitate the interchange of information among members of the association." The list of honorary members proposed includes many prominent scientific men.

❧

The officers and council of the Royal Photographic Society for 1902, recently elected after a spirited contest, are as follows:

President—T. R. Dallmeyer, F.R.A.S. *Vice-presidents.*—Sir William Abney, K.C.B., F.R.S.; the Earl of Crawford, K.T.; Dr. P. H. Emerson, B.A., M.B.; and Professor R. Meldola, F.R.S. *Treasurer*—J. Sterry.

Members of Council—H. Walter Barnett, F. Bishop, C. H. Bothamley, F.I.C., F.C.S.; J. Cadett, St. L.

Carson, B.A., B.Sc.; W. L. Colls, Douglas English, B.A.; E. C. Fincham, M.R.C.S., L.R.C.P.; T. E. Freshwater, F.R.M.S.; A. Haddon, Sir W. J. Herschel, Bart.; F. Hollyer, F. Ince, G. Lindsay Johnson, M.A., M.D., B.Sc., F.R.C.S.; E. B. Knobel, F.R.A.S.; J. C. S. Mummery, Wilson Noble, M.P.; E. Sanger Shepherd, J. W. Swan, M.A., F.R.S.; and Professor W. C. Unwin, B.Sc., F.R.S.

Pictorial Judges—W. R. Bland, W. Crooke, P. H. Emerson, Lieut.-Col. J. Gale, and J. C. S. Mummery. *Technical Judges*—Sir W. Abney, Chapman Jones and E. Sanger Shepherd.

◆

Zimmerman's *Northwestern Photographic Recorder* (St. Paul, Minn.) appears in a new dress and improved form, with a well-arranged variety of useful articles and illustrations. Mr. R. A. McFarlane is the editor of the journal. In the last issue received we note the interesting fact that Mr. E. O. Zimmerman, Mr. C. S. Pattee, and Mr. E. F. Zimmerman have retired from the officership of the firm of Zimmerman Bros., and that the business will hereafter be conducted by Mr. F. H. Lloyd, President and Treasurer; Mr. H. Sievers, Vice-president, and Mr. W. Hoffman, Second Vice-president.

These gentleman are all well known in the northwest and have been associated with the firm of Zimmerman Bros. for many years. We wish for them the same goodwill and prosperity which attended their predecessors.

◆

Professor A. E. Verrill, of the Department of Zoölogy at Yale University, has shown before a recent meeting of the Connecticut Academy of Science the results of a new process of color-photography invented by his son Mr. A. H. Verrill, a New Haven photographer. The prints exhibited are said to have been photographs in natural colors made direct from nature by an orthochromatic process, and the result of wholly photochemical processes. No details of the method have yet been published.

Mr. S. R. Crockett, the well-known writer of fiction, is quoted as expressing the following opinion of photography as his hobby: "Neither do I affirm (lest my readers be tempted to send me also a little hatchet and a life of George Washington) that I make no failures. Nay, rather, from the standpoint of the competition and the great photographic exhibitions, it may be more truly said that I never make any successes. But from the point of view of a bread-winning man of letters these scraps of sun-writing, hieroglyphic to others, are worth honest-minted gold. In addition to which they bring with them laughter and tears, the brightness of rivers wherein the children paddle (I can see them with their bare, brown legs), or the gloom of storm as the thunder-cloud settles down upon the mountains. Breaths of high-hill air come to me as I turn them over. Patches of gold and blue shine on Cathedral pavements, worn to the quick by the knees of faithful worshippers. In a word, if any desire to preserve such-like things against the day when he shall not wander any more, when the gold shall have faded from well-beloved tresses, and the voices that now greet him are silent—let him do as I have done, as it were, bottle his sunshine against the days of darkness. For assuredly they shall be many."

◆

The executive board of the Photographers' Association of Pennsylvania, West Virginia, Maryland and Delaware, met at Philadephia January 25, President Alfred Holden in the chair. The work of the board comprised the drawing up of plans for the forthcoming convention—the first combined meeting of the associations mentioned. The convention will meet at Industrial Hall, Philadelphia, July 15, 16, 17, 18. A liberal prize list and similar features of interest are being prepared and will be announced later.

◆

Mr. F. H. Collins, 42 Williams St., Nashua, N. H., who some time ago introduced cloth-covered frames made along the lines set out by Mr. J. Horace McFarland in

THE PHOTO-MINIATURE No. 20, writes that his frames are steadily growing in popularity. Those who need inexpensive frames for photographs, simple in design and with an attractive choice in colors, will do well to get particulars from Mr. Collins.

❧

Among the calendars received at the beginning of the year, that sent by D. J. Lindsay & Company, Boston, deserves mention. It is embellished with a 4 x 5 Velox print of a fire photograph made at 3 A. M., and shows a building in ruins lighted by the glare of the conflagration. The print is stained a dull red and presents a realistic view of the scene.

BOOKS AND PRINTS

"The Bromide Monthly" has changed its name and is now published as "The Photo Critic," with an outspoken purpose to be all that the new title implies. Mr. Juan C. Abel and Mr. H. M. Reichenbach are the editors of this interesting little journal which should be seen by those desiring information concerning the possibilities of bromide paper—to which it is almost wholly devoted.

The last issue contains a negative on Rotograph Negative Paper which should help this admirable product to the popularity it deserves. We believe that a copy of "The Photo Critic" can be had by sending a 2-cent stamp to the Rotograph Company, 101 Fifth Ave., New York.

❧

Mr. Edward W. Newcomb, known to fame and fortune as the editor of the "Photo American," and the inventor of many useful photographic specialties, has "boiled down" a lot of valuable information in his "How to Improve Bad Negatives," just published at $1.50 post free from the author, Bible House, New York. As an expert in this peculiarly difficult field, Mr. Newcomb knows whereof he speaks, and his little book is a gold mine of work-room tips and short cuts to success.

Simplified Instructions in Retouching Negatives, Spotting Prints and Seven Methods of Photo-reproduction in Colors including Lantern-Slides and Transparencies, by Frank B. Clark, Artist, Washington, D. C. 46 pp. Paper covers, 50 cents.

Mr. Clark is a skilled workman in retouching and coloring photographs, lantern-slides, etc., and his pamphlet contains practical instructions for these branches of work. It does not deal with the direct production of photographs in color, as the title may lead some to suppose, but with coloring by hand. In style and arrangement the book is somewhat unattractive, but its information is concise and pointed, for which reason it is worth its cost many times over.

❧

"The Camera," of Philadelphia, edited by Frank N. Chambers and John Bartlett, has been compelled to seek new and larger quarters at 114-120 South 7th Street, where it now occupies a whole floor of the building. We are glad to note this evidence of success, and wish for our lively little contemporary a still greater prosperity.

❧

Mr. W. I. Scandlin, for some years past editor of Anthony's Photographic Bulletin, the International Annual, etc., has severed his connection with the Anthony & Scovill Company, and will immediately take up a special line of photographic work, in which the readers of THE PHOTO-MINIATURE should have more than ordinary interest. This is the establishment of a bureau of photographic information, from which, for a moderate cost, amateurs and professionals can secure prompt help in difficult problems concerning technical work or business methods. The bureau is arranged on a coupon system, and the plan is adapted to almost every need of the photographic worker. Supplementing this question and answer bureau, correspondence courses in special branches are offered.

The bureau aims to supply a wide-spread need, and under Mr. Scandlin's able direction should speedily win a prominent place among photographic activities. A long and close acquaintance with Mr. Scandlin's abilities in photography and kindred arts enables us to recommend his service to our readers with complete confidence. Mr. Scandlin may be addressed at 345 Sixth Avenue, Brooklyn N. Y.

❧

Lecturing before the students of Johns Hopkins University on "Recent Developments in Color Photography," Prof. R. W. Wood expressed the opinion that the day is not far off when color photography will be generally understood and applied in the arts and industries. The lecturer exhibited many interesting examples of photography in colors to support his opinion. Some of these examples were made by Prof. Wood himself, others had been sent him by prominent European investigators. The lecture was received with much enthusiasm.

In view of the revival of interest in the problems of color photography, we are having prepared a monograph on this subject, to be published in an early issue of THE PHOTO-MINIATURE. The monograph, written by one who is thoroughly familiar with what has been done in the photography of color, will give simple and practical information which will enable the reader to produce successful results without expense or difficulty.

WINTER
Alvin Langdon Coburn

The Photo-Miniature
A Magazine of Photographic Information
EDITED BY JOHN A. TENNANT

Volume III MARCH, 1902 Number 36

LENS FACTS AND HELPS

In the first number of THE PHOTO-MINIATURE we gathered a few elementary notions as to how the lens forms an image on the photographic plate, as to the aberrations or defects which lenses are apt to possess, the meaning and practical import of focal length, conjugate foci, fixed focus and depth of focus, and as to the action of the diaphragm and the significance attaching to the various numbers by which diaphragms are denoted. Finally we took in review the different types of lenses, glancing briefly over the older and familiar patterns, and considering the more important modern anastigmats at greater length. To attempt this within the compass of one issue meant compression of much matter, and the omission of certain not unimportant points in photographic optics. In the following pages the science of the lens is further pursued; but a chief recommendation of this number is the practical information it gives relating to the use of lenses, including the home testing of one's own instruments. What follows has been written for reading in connection with THE PHOTO-MINIATURE No. 1, and I am hopeful that the two together will supply the beginner with an elementary guide to the intelligent use of his optical tools. The serious student will find in the more advanced and theoretical treatises on photographic optics recently published abundant material for his helping. In these pages we must still confine ourselves to the simple problems confronting us in every-day work with the lens. The monograph here offered is the work of Mr. George E. Brown of *The Photogram*, and joint author with Mr. Thomas Bolas of a notable book on *The Lens*, just published.

Definition

One of the first, seemingly insoluble, problems which the student of lens matters encounters is the way in which the lens forms its image—in other words, the problem of definition. We have read that a lens brings rays of light from the various points in the object again to points of light on the ground-glass, thus giving the image. Theoretically this is the case, but practically no lens, however perfectly constructed, gives an image in *points*, according to the definition of Euclid, i. e., possessing no magnitude or area, but only position. For "points" read "discs," keeping in mind an image built up of countless tiny circular patches, and you get an idea of what the actual lens image is. The smaller the diameter of these discs the finer the definition of the lens. An experiment which any one can conduct will help to make this idea clear. Focus on the ground-glass a scene in which bright points of light exist against a dark background, say, foliage through which the sun is shining or a row of distant gas lamps at night. On moving the ground-glass out of the position of sharp focus each tiny spot of light will expand into a circular patch which becomes larger as the screen is moved away, and if close together begin to overlap. The images of the distant points have become large enough to be seen by the eye, due to the crossing of the rays. The sharpness or otherwise of an image on the ground-glass depends on these discs or "circles of confusion," as the optician calls them, not exceeding a certain size.

Circles of Confusion

A standard sharpness or unsharpness—for sharpness is relative not absolute—which is generally taken as that of a "circle of confusion" of one-hundredth of an inch diameter. It is found that a photograph made up of tiny discs of this diameter appears to all intents and purposes sharp when viewed at the normal distance of ten inches or so. This is merely a standard of convenience. A large picture which is to be viewed at a distance of several feet may be considered sharp, even though its definition is much coarser than this standard. Your sharpest negative would look fuzzy and woolly if examined under a microscope.

Parallel Rays

In these pages we must often speak of parallel rays, so it is well to first explain, for here again theory is apt to mislead. Parallel means lines which, produced ever so far either way, never meet, says Euclid. Rays from a distant point are parallel when they reach the camera, says the text-book. The practical explanation is that rays from a fairly distant object—which we may represent by lines drawn from that object—are so nearly parallel that the difference doesn't matter. In lens calculations any object fifty times the focal length of the lens from the camera may be considered as sending parallel rays upon that lens, and to all intents and purposes the rays would be no nearer parallelism if you moved the object to an infinite distance. Thus with a 6-inch lens this distance—the "infinity" of the formula—is 25 feet, and when we speak of a point at an infinite distance from the lens we shall not be wrong in substituting a distance found according to the above rule, i. e. fifty times its focal length.

Focal Length and Focal Power

These two terms are the opposite of each other. The lens, we know, is like a prism: it bends rays of light, rays passing through any part being bent towards the center of the lens. The stronger the bending action of the lens, the greater the focal power, i. e., the nearer the point or focus, whereat the bent rays meet, to the lens. The weaker this bending action the greater the focal length of the lens, i. e., the further the focus of the lens from its surface. This is the idea of focal length. To give a precise definition is not so simple a matter.

Focal Length for Parallel Rays

In the first place, when expressing the focal length of a lens by the distance of its focus behind the lens, we must specify for what description of rays. Obviously the point will vary according as the rays are divergent, parallel or convergent. Hence, in speaking of the focal length of a lens, we always imply for parallel rays, and take care, in any tests, that light reaches the lens at the distance laid down by the rule given above. The focal length then of a lens, let us repeat, is the distance of the sharp image of a distant object from—where ?—the back glass surface, the stop or what part of the lens ? To answer this leads us to another point which we will now consider.

Nodal or Gauss Points

If we mount a lens on some such bit of apparatus as shown in Fig. 1, so that it can be rotated around a fixed center, and arrange for it to receive rays from a distant object, we shall find that we can adjust its position over the pivot so that on moving the lens round the image of the object does not move on the screen. When this is the case the "nodal point of emergence" is exactly over the pivot. We will explain what this means directly.

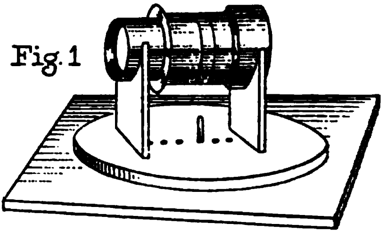


Fig. 1

Nodes of Admission and Divergence

If we reverse the lens on its bearings, we may find that its position in regard to the pivot is appreciably different. The "node of admission" (see below) is now over the pivot. Every lens has these two nodal points, which sometimes coincide when we call the point the optical center, but are usually separate—sometimes close together, sometimes far apart.

Properties of the Nodal Points

When a ray of light goes through a lens it is bent twice—when it enters the glass and again on emerging into the air. Hence its course in the glass is not a continuation of its direction before or after passage through the lens. But if we draw lines continuing those first and final directions, each toward the axis of the lens, we get two points in the lens—the so-

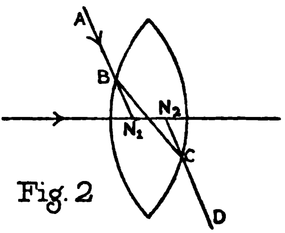


Fig. 2

called nodal or Gauss points (Fig. 2). The property of these points is that a ray of light which in entering the lens passes through one of them emerges as if it comes through the other (N_1 N_2). The first we call the node of admission, the second the node of emergence. The former is nearest to the object, the latter to the image. If the lens is reversed, the node of admission becomes that of emergence, and *vice versa*.

Modern Definition of Focal Length

Now we can get back to a precise definition of focal length. The distance of the sharp image of an immensely distant object from the node of emergence is the focal length of the lens.

Equivalent Focal Length

In a very thin lens, such as a spectacle lens, the two nodal points coincide. Such a thin lens of focal length equal to any given lens of whatever construction would produce an image of the same size if placed at the node of emergence of the given lens. The latter is thus said to have an equivalent focal length of so much, i. e., equivalent to the distance of the thin lens from the sharp image of an immensely distant object. Any combination of lenses can thus have an equivalent focal length of say x inches, i. e., a thin lens of x inches focal length placed in the node of emergence gives an image of the same size.

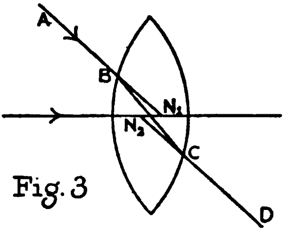


Fig. 3

Normal and Crossed Nodal Points

The node of admission may be in front of the node of emergence or it may be behind, as in Fig. 3, in which case the nodal points are said to be crossed. The nodal point theory explains why the method sometimes given for finding the focal length of a lens, viz., arranging it to give an image same size as the object and dividing the space between original and ground glass by 4 is not correct. In the case of normal nodal points, the distance between them must be subtracted before dividing; in the case of crossed nodes it must be added.

The Law of Conjugate Foci As explained on pages 13 and 14 of THE PHOTO-MINIATURE No. 1, the nearer an object is to the lens the further away behind the lens is the point where the sharp image of the object is formed. If we bear in mind the idea of the lens as a bender of rays of light, the reason for this is clear to us. The nearer an object is, the more divergent the rays which proceed from each point in it and so, as the lens can only do so much bending and no more, the further away the point at which these rays are brought to one point again. For every distance of the object in front of the lens there is a corresponding distance of the image behind the lens, and these two distances are connected by a simple arithmetical rule or formula which is of such frequent use that I am at some pains to explain it here. In formula form the rule stands thus: $\frac{1}{F}=\frac{1}{U}+\frac{1}{V}$ where F is the focal length of the lens, U the distance from object to lens and V the distance from lens to plate. Those who know a little algebra will be able to work every problem for themselves, but for the benefit of those who do not I will put it into still simpler form.

Calculating Conjugates If we know the distance of an object (i. e., U, the conjugate in front of the lens) and the focal length of the lens (F), we can calculate the camera extension (i. e., V, the conjugate behind the lens) (see Fig. 4). The rule is:

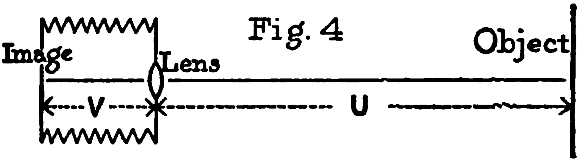


Fig. 4

Multiply the distance by the focal length, and divide by the distance *minus* the focal length. In formula form $V=\frac{U \times F}{U-F}$. An example will make clear. Required camera extension for object 5 feet away with lens of 6 inches focus. We must be careful to have all figures in feet or inches — one of the two, but not both. So, we get $(5 \times 12 \times 6) \div (5 \times 12 - 6)$, i. e., $360 \div 54 = 6\frac{2}{3}$ inches.

To put the problem the other way round, we can calculate the distance of an object from the camera (i. e., the front conjugate, U, for a given focal length, F and camera extension, i. e., back conjugate, V. In this case $U=(F\times V)\div(V-F)$. Thus, to find nearest point for a sitter, if a camera with 9-inch lens racks out only to ten inches, $V=(9\times 10)\div(10-1)$, i. e., $90\div 1 = 90$ inches = 7 ft. 6 inches.

The Arithmetic of Enlargement and Copying

From the same formula we deduce the rule in a form applicable to the useful purposes of copying, enlarging, and any work where size of image enters into question. As before, suppose F the focal length, U the distance of object, and V the camera extension. Let r also be the number of times the line in the object is larger than the same line in the image.

Here U= the focal length × r, plus one focal length.
V= the focal length ÷ r, plus one focal length.

Thus: we are copying a 20-inch picture to make it five inches, i. e., r equals 4 — the focal length of lens is six inches:

$$U = (6\times 4) + 6 = 30 \text{ inches},$$
$$V = (6\div 4) + 6 = 7\tfrac{1}{2} \text{ inches},$$

or distance of picture must be 30 inches and camera extension must be 7½ inches.

A useful check on the calculation is to notice that one distance is always r times the other. Thus $7\tfrac{1}{2}\times 4 = 30$. Remember, also, that if the light passes the other way through the lens the rule still holds good. Thus, in the above example, if we illuminated a negative placed 7½ inches behind a 6-inch lens an image four times the linear size would be exactly thirty inches in front of the lens.

One other way in which the formula is used is especially useful in studio matters. Required the focal length of lens necessary to give a certain reduction at a given distance. Here F, the focal length of lens = the distance $\div (r+1)$. For example, to find the focal length of lens necessary to take a portrait of an average figure (66 inches) on a *carte* size (3 inches) in a 30 ft. studio. Here $r=66\div 3=22$, $U=30\times 12$, $F=(30\times 12)\div(22+1)$ — nearly 16 inches.

Angle of View

What is a wide-angle lens? Although those who ask this question should find their answer on pages 23 and 26 of THE PHOTO-MINIATURE No. 1, I make room for a word or two on this ever-present difficulty. Here is the crux of the matter. If a dealer calls a lens of a certain kind a "wide-angle," I say he is right. If a man tells me that his 9-inch focus "wide-angle" won't include all he wants on his 4 x 5 plate, I see that he is ignorant of the first thing about "wide-angle" and "narrow-angle." The trouble lies here: When the dealer lists a lens as "wide-angle," he means that it *can* include a wide angle of view, say 90°—that is, if you put a plate behind it big enough to receive all that the lens will give. But if you don't, why your lens is to all intents and purposes a medium- or narrow-angle lens. You are simply cutting out the outside parts of the angle over which the lens will define. Potentially the "wide-angle" of the catalogue is always wide angle; actually it is wide, medium or narrow angle, according to the size of plate or screen placed behind it.

The Diaphragm

The several purposes of the diaphragm are clearly explained in THE PHOTO-MINIATURE No. 1, pp. 16 to 23, where also the reader can inform himself on that difficult point to beginners, the meaning of *f* numbers. To understand these numbers and to be able to figure with them is an essential preliminary to intelligent camera work, and I am supposing that my reader has gained this facility from the source I have indicated.

When F Numbers Mislead

The *f* number or rapidity of a lens does not always indicate its "working aperture." It only does so when the lens is being used at practically its normal extension when focused on distant objects. As soon as the camera has to be racked out further than this distance the real *f* number is greater than that marked on the mount in the proportion of the greater extension to the first and lesser extension. Thus when we use a 6-inch lens at *f*/8 for copying same size, i. e., with the camera at 12 inches extension, the real *f* number is *f*/8 × $\frac{16}{8}$ = *f*/16, and the exposure is 4 times what would be required with the lens in its normal place. Another way of expressing the same fact is to say that when the camera is used at extensions over and above the normal, the *exposure* is increased in proportion to the square of the greater extension to that of the normal extension. This fact is of great importance in copying, and it is a good plan when much work is done with one lens and stop to draw up a table giving the exposures at each extension, compared with what experience has shown to be correct when copying same size. Thus:

CAMERA EXTENSION (Inches)	10	9	8	7	6
EXPOSURE (Seconds)	200	160	130	100	70

F Numbers of Single Combinations

A similar allowance must be made when one or other of the combinations of an R. R. or anastigmat is used as a single lens. Neglecting for the moment the condensing action of the front lens when the whole R. R. is used, which slightly alters the *f* value (THE PHOTO-MINIATURE No. 1, page 16) the numbers marked on the mount cease to have any value when only one single combination is in place. A quite approximate rule is to double the *f* number when the back or front combination of an R. R. is being used. Even with rapid rectilinears of stereotyped design this is not a safe guide, for the focal length of their single combinations are usually appreciably different from double the focal of the whole lens. With anastigmats it has no value whatever. Usually the makers state the focal lengths; which divided by the diameters of the various stops give the *f* numbers of the single combinations. This is easily remembered and will explain many difficulties encountered with convertible lenses.

Non-Achromatic Lenses

What the defect of chromatism is will be clearly seen from page 7, THE PHOTO-MINIATURE No. 1. An achromatic lens is one which refracts chemical and visual rays to the same extent. Thus the image which we focus, and which is formed mainly by the yellow rays of the spectrum, will be sharp when received on the photographic plate which ignores those rays and uses the blue or violet part of the spectrum. Yet by allowing for the difference in the action of a non-achromatic lens on these two sets of rays we can obtain as sharp pictures as we desire. The two methods of doing this mentioned below are of importance as regards the use of spectacle and other non-achromatic lenses in practical work. One plan is to focus with the lens temporarily shortened in focal length to just the extent corresponding to the inward movement required by its chromatism. This is done by inserting a weak, i. e., long-focus, lens in the tube or behind the lens and withdrawing it before exposure is made. The reduction required is about 2 per cent, which means that the focus of our supplementary and temporary lens must be from forty to fifty times that of the lens to be corrected. This plan is best for outdoor work.

In default of this method the best expedient is to move the lens and plate nearer to one another after focusing, and this is the best course when using such lenses for indoor work such as copying, because the correction varies with the conjugate focus of the lens, i. e., is greater when the lens is racked out more than usual. The variation is as follows:

Ratio of image to original*	$\frac{1}{10}$	$\frac{1}{5}$	$\frac{3}{10}$	$\frac{4}{10}$	$\frac{1}{2}$	$\frac{6}{10}$	$\frac{7}{10}$	$\frac{4}{5}$	$\frac{9}{10}$	$\frac{1}{1}$
Correction per cent	2	2.2	2.4	2.6	2.8	3.0	3.2	3.4	3.6	3.8	4

To arrange the matter in practice, fit a pointer to one moving part of your camera and a graduated scale to another part against which it moves,—say, pointer on the camera front and scale on side of baseboard. The paper scales divided into inches or centimeters and their subdivisions and sold for draftsmen answer well.

---

*Objects at an infinite distance.

Combining Lenses

A convex glass placed before a lens reduces its focal length, bending the rays more abruptly to a focus. A negative lens interposed sets the focus further back. One practical application of this is the "magnifier" or portrait attachment which enables us to take near objects with an ordinary fixed focus camera. The rule for the focal length of this auxiliary lens is very simple in this special case: focal length of attachment must equal distance of object to be focused sharply. This holds good whatever the focal length of the lens. Thus to focus an object at 2 feet 6 inches, a 30-inch focus convex lens is wanted. This special rule follows from the general formula in the next paragraph.

The Rule in Combining

To find the resultant focal length of two lenses placed at a short distance apart, multiply the focal lengths together and divide by the sum of them less the distance apart. Thus 10-inch and 6-inch lens 1 inch apart give focal length of $\frac{10\times6}{16-1}=\frac{60}{15}=4$ inches. This is all very well so far as it goes, but generally we want to use this rule inside out, so to speak. We want to know what focus we must use to reduce or increase the focal length of a lens to a given amount. This rule is then thus: Multiply the focal length of your lens by the reduced focal length you desire and divide by this original focal length less the final focal length. Thus, you want to reduce an 8-inch lens to 5-inch: $8\times5\div(8-5)=40\div3=13\frac{1}{3}$; auxiliary lens must be 13⅓ inches. And the distance between? To get that, formulæ become cumbrous and difficult. The straight and near enough plan is best. Adjust in the place which will give best definition over your plate. Generally we can put up with the lens being a little different in focus from that for which we set out for in this work.

Getting a Lens

Having now cleared up a number of points in lens optics, we can pass to matters more practical, the first of which is—what lens to get. Probably the reader of these lines has already a camera, bought with the lens all ready fitted, and he wants to spend his money to the best advantage on a better instrument. In a lens you pay the price for a greater or less number of optical qualities which you may or may not want. There are photographers who do all their work with a cheap spectacle lens and wouldn't purchase an anastignat if they had the wealth of Ophir, but they don't snap-shot in dull winter light or photograph tall buildings in narrow streets. The qualities the optician has to sell are chiefly these: (1) Fine definition *at large aperture*. Note the italics. Few lenses will not give sharp pictures if stopped down to *f*/54 or *f*/64. It is the crisp definition at *f*/6 or *f*/8 which costs money. (2) Large aperture with fine definition—really quality No. 1 turned round about. (3) Flatness of field. The want of this quality is a defect of the lenses before the anastigmats which have come since 1892–3. Very few rapid rectilinears, prior to that date will give a flat field over an angle of more than 40° or 50°, i. e., comparable with a quarter plate being covered by a 5-inch lens. Many a single lens has a saucer-like field within this angle. (4) Covering a plate of larger size than that on which it is used at full aperture. In other words ability to act as a wide-angle lens when stopped down. (5) Separability and variation of foci. If you can take a lens apart and use the separate components perfectly as long-focus lenses the gain is obvious. Such lenses are separable: others which act properly only *en bloc* are inseparable. An ordinary R.R. if taken apart must have its single combinations stopped down to *f*/22 or *f*/32 to give passable definition. On the other hand, a Zeiss-Satz lens divides into single anastigmats which work perfectly at *f*/12.5. Then, again, some separable lenses are made with the components of equal focal length and each roughly double that of the whole lens; others with the separate components unsymmetrical, i. e., the focal length of one is, say, twice the focal length of the whole, while that of the other is 1½ times. The variation of focus is a distinct advantage.

Lenses for Choice

The types of lenses available (excluding the portrait lens, which is special type for a special purpose and is discussed below) begins with spectacle lenses (supplied in convenient casket sets), single or view lenses, rapid rectilinears, wide-angles of the pre-Jena days and practically extinct, and last and most important, anastigmats of different rapidities.

Spectacle Lenses

A *periscopic* spectacle lens, i. e., one having one side concave and the other convex but with the convex of deeper curvature, acts fairly well as a lens for landscape work but it is not rapid and it is not achromatic. It is used with the concave side towards the plate and a stop, a short distance, about $\frac{1}{8}$ the focal length of the lens, in front of it; and as a rule the size of the stop must be such as to give *f*/28 or *f*/20 so that rapid exposures except in very bright light are out of the question. As regards the chromatic aberration of the spectacle lens, the defect is theoretical, because one must always use a stop which so narrows down the bundle of rays reaching the plate that the effects of chromatism do not appear; but when two spectacle lenses are used together, forming a doublet which can work at a larger aperture, the correction for chromatism already given has to be made.

The chief use of spectacle lenses is in landscape work because (1) they can be cheaply obtained of any focus and the worker is not tempted to make one lens do for every subject. He takes a stock of thin meniscus glasses and learns to suit his lens to the subject. The connection between focal length and perspective is mentioned later. (2) Used at larger apertures, *f*/10 to *f*/16, the spectacle lens gives a pleasing diffused definition much beloved of some pictorial men. Mr. George Davison is said to have done all his work with a spectacle lens, and once exhibited the lens on the frame of the picture at one of the London shows. For technical work the spectacle lens can never compete with the more expensive objectives.

Caskets or Combination Sets

A number of makers—Wray (Highgate, England), Busch (Hatton Garden, London), Dolland (Ludgate Hill, London, E. C.)—put up spectacle lenses in sets of half a dozen or so, each lens fitting into a common mount. Such a casket places a great range of focal lengths at one's disposal, and the rapidity of the doublets is fair. Thus, a Busch casket of 7 lenses gives foci of from 4 to 30 inches — 15 different values — and the definition with the doublets, working at *f*/8, or thereabouts, is good enough for any landscape work. The "bow" method of getting over the chromatism trouble is used with the Busch casket.

The Achromatic Single Lens By an achromatic "single" lens is meant a combination of two or more glasses cemented together, the compound construction correcting chromatic aberration. The single lens is thus a step in advance of the spectacle lens, but in its older forms only a step. It is achromatic, but, like the spectacle lens, has limited covering power, round field and low rapidity, *f*/12 to *f*/16 for lenses covering over a moderate angle. Moreover, it possesses distortion, and hence is for landscape where straight lines at the edge of the picture, which would be shown bowed outwards, rarely occur. Ancient authorities place the fewness of the glasses in the view lens as a great qualification as regards its giving "crisp" images, but this is one of those things which happen on paper more than in practice. Although having more reflecting surfaces, the finish of the anastigmat enables it to equal the view lens in the "snap" of its pictures.

The Rapid Rectilinear marks the next step towards the anastigmat. It does not give bowed lines at the edges of the field, is more rapid (*f*/8), and can be divided into two single lenses which must generally be stopped down to *f*/22 or *f*/32 for sharpness; with a small diaphragm the rapid rectilinear does not cover a much larger plate, astigmatism marring its definition as soon as a wider angle is entered.

Considering the many points in which the anastigmat is superior to the rapid rectilinear, the economical course for one who wants one lens for all purposes is to get the former. The rapid rectilinear is still a useful lens for certain special work, say in copying, enlarging and reducing where fair rapidity and rectilinear drawing are desirable or essential. Almost all cameras sold at from $10 to $40 are fitted with rectilinear lenses.

Wide-angle Lenses were made in the pre-Jena days specially for interiors and such like work. Their largest aperture was usually $f/16$ or less, and as almost every present-day anastigmat covers a larger plate at a larger aperture with better definition the wide-angle lens of the old time is practically obsolete, though existing lenses have their uses for copying.

Anastigmats These modern lenses, of which pages 30 to 35 in THE PHOTO-MINIATURE No. 1 give a brief account, supply practically all the five qualities mentioned above. Definition is remarkably fine at a large aperture; the field is flat over a wide angle; stopped down the lens covers a much larger plate, thus acting as a wide-angle; and most anastigmats divide up into two perfect single lenses, each working at $f/12$ or thereabouts. This means that in an anastigmat you get your normal rectilinear of focal length suitable for some one plate; you get two single lenses of narrow angle on that same plate or of normal angle on a larger plate, and you get a wide-angle lens for a much larger plate by stopping down the whole lens to $f/16$ or $f/22$. The anastigmat has its disadvantages, but they are trifling compared with the many positive gains afforded. To mention two, however: The thickness of the glasses causes a certain extra absorption of light which does not affect ordinary work, but is sufficient to upset the adjustment of a set of tricolor light filters when such a lens is used in place of a less complex doublet. Then, also, the very largeness of the aperture of the anastigmats is a hindrance to the proper drawing of solid objects. A lens with a stop say 1½ or 2 inches in diameter, will give a perfect reproduction of a flat object placed before the camera, but will not draw a solid object correctly. This is because the area on which rays fall is larger than the pupil of the eye, a drawback to large aperture lenses pointed out long ago by Brewster. This defect is not likely to make itself evident very frequently; the most usual occasions are when photographing small solid objects on a fairly large scale so that they are close to the camera.

The final conclusion is that there is little inducement to make choice of anything between a single or spectacle lens or an anastigmat. Either of the first, especially a casket of the latter, are ideal for landscape work, and are not out of the question for portraiture or interiors. Between them and the complex modern lens there are plenty lower in price, but few which are so economically sound as the anastigmat. Let the purchaser settle what he wants, and see from the makers' list whether he will save money by buying three or four lenses in one, as an anastigmat.

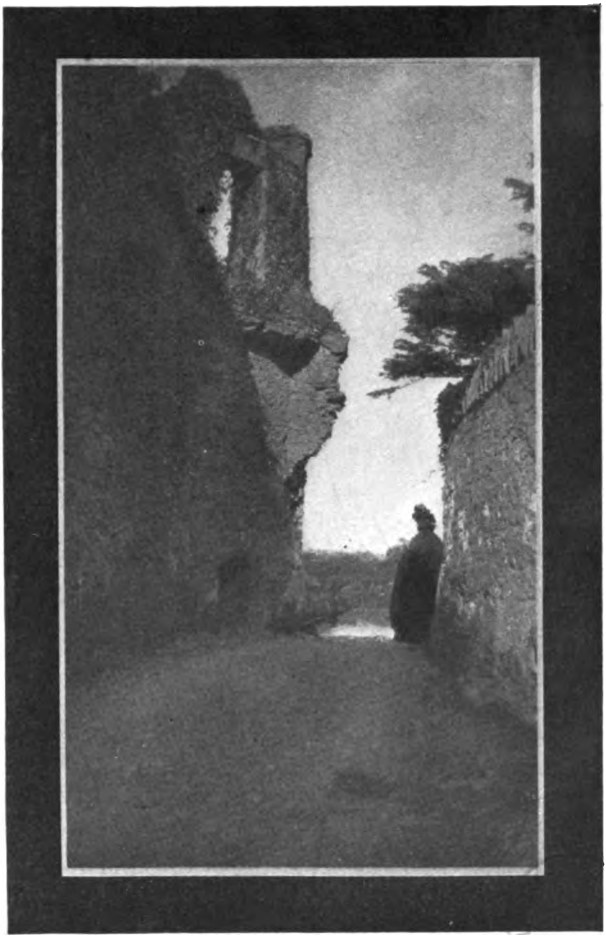
Choosing Between the Anastigmats

Even when one has settled on getting a modern lens, the task is far from being at an end, for among themselves the anastigmats vary in properties and price. It would be quite impossible to individually describe them here. I can only indicate the points which are most worth paying for, mentioning that according to Bolas, "very approximately the competition is such [amongst modern anastigmatic lenses] that the real value is about proportional to the price."

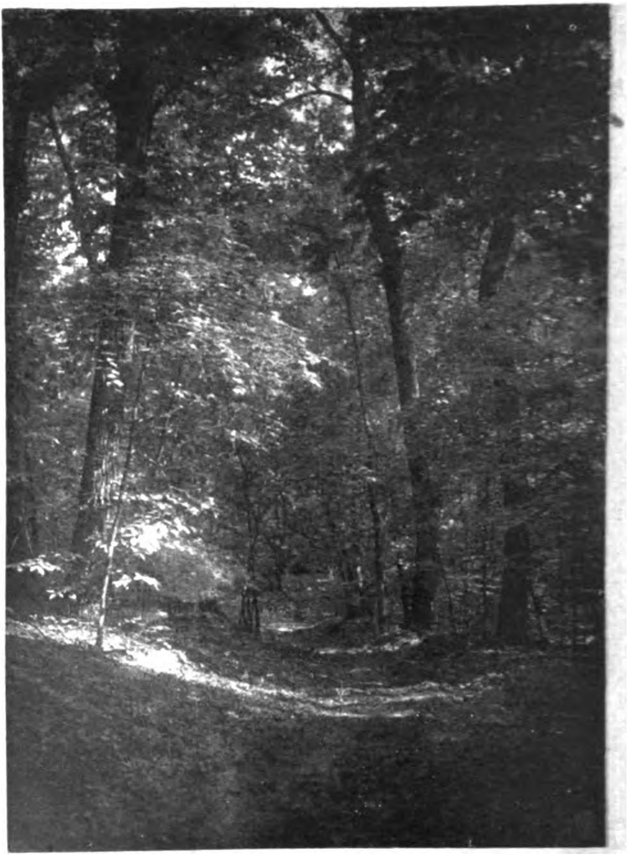
Rapidity

There are cases in which a very large aperture is absolutely necessary; it simply makes the difference between certain work being possible and being impossible. I have a man in mind who is keen on church-window work in natural colors. He simply couldn't get his three negatives in one day if he had not a lens working at *f*/4. On the other hand, large aperture is a positive drawback for other purposes. A *f*/4 lens on a hand-camera narrows down the limits within which one gets sharp pictures. Thus, with a 5-inch lens at *f*/4 one gets in focus all objects beyond 52 feet; with *f*/8 this distance is 26 feet. With a 4-inch lens the *f*/4 limit is 33 feet. Hence you work your hand-camera most advantageously at large aperture when you use short focus. This was known to the wise long ago. See Piazzi Smyth's article in the British Journal Almanac, 1874.

But for general work the choice between two anastigmats of apertures *f*/6·8 and *f*/7·7 is better made on other grounds than rapidity—say separability, flatness of field. The gain as regards brief exposures is not great enough, e. g., *f*/7·7 requires only from $\frac{1}{8}$ to $\frac{1}{4}$ as much more time as *f*/6·8.



ROSS CASTLE, KILLARNEY
Alvin Langdon Coburn



"WALDWEBEN"
Katharine S. Stanbery

Separability The use of the separate combinations as single lenses is worth having if you can use it, i. e., if your camera will extend enough to take the lenses. The Voigtlænder is notable among anastigmats in not being separable, and the makers strongly insist that for the most perfect complete lens separability must be dispensed with. "You can't make a pickax and razor in one," said Dr. Miethe, the designer of the Collinear lenses to me in Berlin. Admitting the analogy, the long foci are an advantage for which we will often sacrifice something else, and then one must see that the bellows will permit the lenses to be used.

The covering of a larger plate is a point on which anastigmats vary, the limit of the covering being frequently the mounting, not the lens itself. Where the question of price enters, it is obviously foolish to pay extra for a facility of which you cannot make use. The reserve covering power of the least "wide-angle" anastigmat provides I should say for any side or front movement likely to be used.

The Later Anastigmats Lens-making has made several notable steps forward since THE PHOTO-MINIATURE No. 1 appeared, and we must record several new anastigmats with properties which mark them out among modern lenses. Chief among these are the Planar and Unar of Carl Zeiss, or, to give their real author, of Dr. Paul Rudolph, the scientific director of the Jena works. Technically the Planar consists of combinations built up of a negative and positive lens separated by a medium of low refraction (Fig. 5). By this method of construction a flat field free from anastigmatic and other aberrations can be covered over an angle of 62° to 73° at the enor-

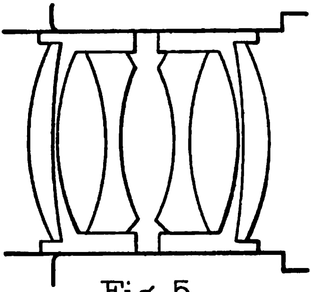


Fig 5

mous apertures of *f*/3·6 to *f*/5. For instantaneous work of the highest rapidity or in dull weather the Planar is therefore an unique lens, but it should be noted that such large apertures call for the most delicate focusing and precise construction of the camera and plate-holder. The Planar is supplied in focus from ¾-inch to 24 inches, the smaller sizes being suitable for kinematograph work, and for the making of the minute negatives such as are required in preparing the tiny positives of views, etc., for cementing to little Stanhope lenses and insertion in various ornamental nicknacks.

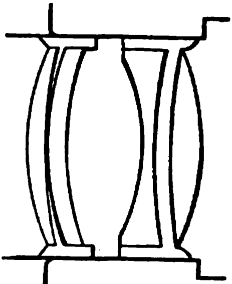


Fig 6

The Unar (Fig. 6) lens of Zeiss comes between the Planar and the Anastigmats mentioned on page 31 of THE PHOTO-MINIATURE No. 1, and now known as Protar lenses (only Series II *a*, III *a*, and V of these original anastigmats are now made by Zeiss). The Unar works at *f*/4·5 to *f*/5·6, and is at present made in eight sizes only, from 4⅜ inches to 18 inches focus. The construction of the Unar is much simpler than the preceding lenses of Zeiss, with consequent diminution of price. A later series of the Unar works at *f*/6·3. These lenses are rapid enough for all ordinary work, and are more portable and less expensive than the more rapid series.

The single combinations of Planar and Unar lenses must not be used as single lenses without considerable stopping down.

The Goerz Hypergon is just being placed on the market, but no particulars as to its construction are yet forthcoming. According to the maker's list, it covers the enormous angle of 135°, works at *f*/22 and is fitted with a star diaphragm in front for securing equal illumination of the plate. It is made in four sizes, the smallest, 1¾ inches focal length, covering a plate 6½ x 4¾, and the largest, 6 inches focal length, a plate 15 by 20 inches.

Choice of Focal Length A host of rules might be given on this point, all good in their way, for the focal length is a question of compromise between what we can do and what we want to do. To begin with, a lens of unduly short focus represents the picture too small on the plate and includes a lot of foreground which is usually not wanted. If we go closer to the object we get certain defective perspectives, of which later. A safe rule is not to use a lens of focal length less than the diagonal of the plate, i. e., 5½ inches on ¼ plate, 7¼ inches on 4 x 5, 8 inches on ½ plate, and so on. Many pictorial folk would never think of using such short focal lengths as these; 12 or 15 inches on ¼ plate is more to their taste. On the other hand, it is sometimes necessary to use a short-focus lens when working in confined quarters, of which later.

Another rule as to the focal length of one's R.R. or anastigmat which is useful to bear in mind is, select so that the single combinations can be used on your camera i. e. within its capacity for extension.

What Focal Length Does The first thing in perspective, whether with the eye or camera, is the point of view. This fixes the drawing of the scene. You may put what lenses you like on the front from the Lick telescope downwards, but you don't alter the perspective. What you do alter is the size of your picture and — unless you proportion your plate to the lens — the amount of the view which you include. Try the experiment of taking a scene with a 5-inch wide-angle on a 7 x 5 plate and then, without moving the camera, with a 10-inch lens. In the first negative you will see your second picture in miniature in the center of the plate. Enlarge that part to 7 x 5 and compare prints; you will find them alike in every particular. Perspective pure and simple does not alter with variation of the focal length.

What View-point Does All the talk about wide-angle exaggeration and so on comes from the camera man taking a wrong viewpoint (very likely the only one he can get, but wrong for all that), in which he must use a short-focus lens to get in as much as he wants. He seems to think that if he used a lens of longer focus he would exchange inclusion of all his subject for better perspective. Not a bit of it; only a more distant viewpoint can help him. I give drawings from two photographs by Franz Loescher*. In Fig. 7 we see the result of a near standpoint. The building appears distorted, the corner on the right hand appearing to bulge out; the adjoining building appears insignificant in comparison. Fig. 8 is taken from a distant standpoint with a lens of focal length such that the height of the building from the street to the spire over the clock is the same as before. The difference is seen in the pleasing drawing of the building and the correct proportions of the trees and adjoining block.

The Explanation of Perspective

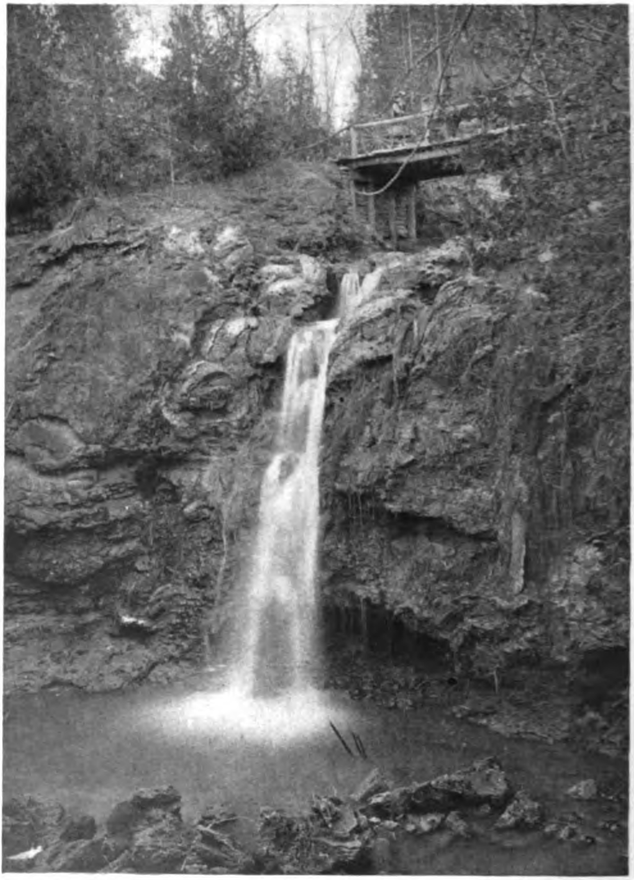
To explain why a near point of view produces these strained effects, I cannot do better than find space for a note by T. F. Bell (*The Photogram*, 1898, p. 253), which makes the matter clear:

"Let a diagram be made as Fig. 9, representing four upright posts at a distance apart, as street lamps. If the eye is at the point A, rays of light coming from the tops and bottoms of post No. 4 will cut the first post as shown at E and F, and if No. 1 post is full size on the picture, No. 4 post will be the height of from E to F on No. 1. If the standpoint is changed to B whilst the first post is kept the same size in the picture by means of a shorter-focus lens, No. 4 post would be reduced, as shown on No. 1 post, by the lines drawn from B to No. 4. Moving to C still further cuts down the distance if No. 1 is kept to the same size, and all parallel lines, such as the ridge and ground lines of houses, will be more or less cut down in this way or made to converge so much more quickly, according to the angle at which they recede into the picture, making near parts appear very large and distant parts very small. This is the effect of a short-focus lens, which, if properly made, does not distort the view, as is often stated, but simply reproduces it from the point at which the lens is used. When close to the view a short-focus

---

*Leitfaden der Photographie (Berlin: Gustav Schmidt).

TIRED
Henry Hall



IN THE SHENANDOAH VALLEY
James H. McCorkle

Fig. 7

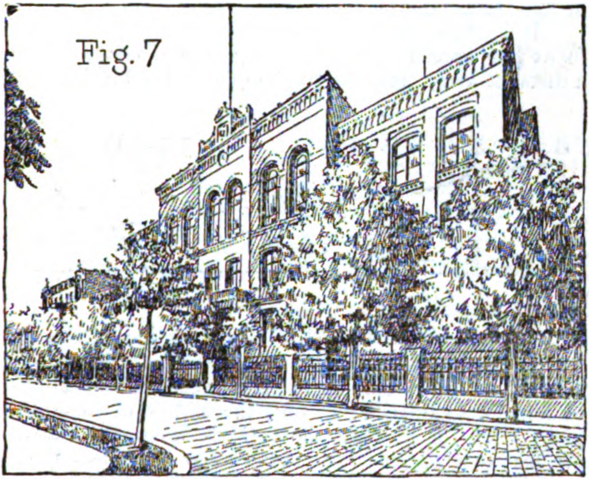
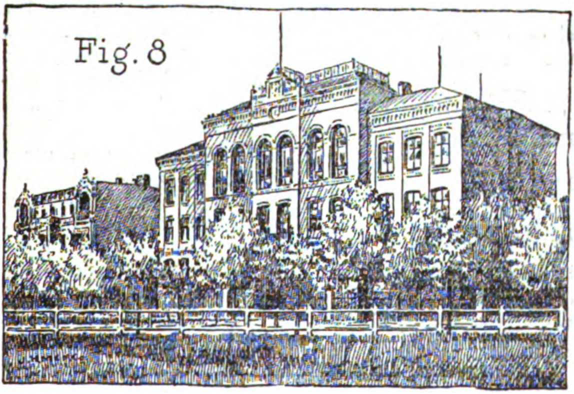


Fig. 8



lens is usually required to include it, and whether short or long focus, the perspective will be the same.

"It is often stated that pictures made with a short-focus lens appear in natural perspective if viewed from a distance away from the print equal to the focal length of the lens used. Theoretically that is true, but very few people will view prints in this way. The advantage of the narrow angle of view (produced by a lens of long focus or by using only the middle of the same plate when a lens of short focus is used) lies in the fact that the eye may move away from this theoretically correct position without creating the feeling of false perspective."

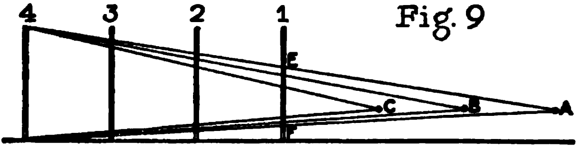


Fig. 9

The Portrait Lens Very little advance has been made on Petzval's original design of the portrait lens in 1841. Dallmeyer reversed the elements of the back combination in 1866. This is now the construction generally adopted.

The "Stigmatic" Portrait Lens This latest of the Dallmeyer lenses is for portraiture, works at *f*/4 and gives fine definition over an angle of 60°. For groups in the studio and other portrait work it is a very satisfactory instrument.

Softness with Portrait Lenses A certain amount of spherical aberration can be introduced into any portrait lens by separating the elements of the back combination. A delicate softness is given to the definition, of which photographers avail themselves sufficiently to induce Dallmeyer to fit a screw to some of his lenses for the easy adjustment of this sometimes desirable diffusion of definition. It is particularly useful when photographing small groups.

The Dallmeyer-Bergheim Lens

This same softness is one distinguishing feature of the Dallmeyer-Bergheim lens; the other is its variable focal length. It consists of a single positive front lens in combination with a single negative back lens. A certain amount of spherical and chromatic aberration left in the lens gives a pearly delicacy to its definition. Its telephoto construction enables foci (ranging in the No. 2 size) from 25 to 40 inches to be obtained, although, be it observed, the camera extension required in each case falls short of these distances, being only 15 to 22½. The rapidity of the Dallmeyer-Bergheim is *f*/8 to *f*/12 according to the focal length.

Focal Length and the Studio

The problem of deciding whether a lens is suitable for one's studio as regards focal length is easily decided by applying the rules of conjugate foci already mentioned. Every one who understands perspective will want to use as long a focus lens as possible for heads and busts for the sake of the better drawing. The limited dimensions of many a studio compels the owner to sacrifice much in this direction. To ascertain the longest focus which can be used, measure first the distance from the camera front—when the stand is pulled as far back as it will conveniently go—to the sitter. Ascertain also the reduction in size required by dividing the upright dimensions of the average sitter by the length of image of same on the ground glass. Suppose this reduction factor is 20 and the distance along the studio 25 feet. Then the focal length $= 25 \div (20 + 1)$ i. e., $\frac{25}{21} =$ or $\frac{4}{25}$ ft. $=$ 14 inches. The camera extension under this condition will be $14 + \frac{14}{20}$, or 14¾ inches.

This simple rule will enable the operator to solve any of the problems of the studio. In going away to photograph a group he can measure up the scene of action and take with him the lens most suitable for the purpose.

Or, to put the problem the other way about. What is the least length of studio in which to do full-length cartes with a 12-inch lens? Taking the average height of subject as 69 inches and assuming the height of image to be 3 inches, the reduction figure is 23. Then the distance between lens-hood and sitter must be 12 + (23 × 12) inches = 24 ft., to which the photographer must add the space required behind the sitter and camera to find the actual dimensions of the studio.

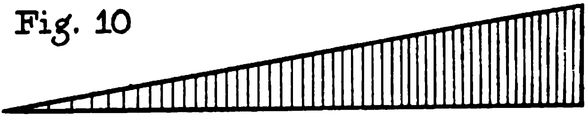
How to Focus

Curiously enough, scarcely one of the text-books on lens topics tells us how to get a picture in the sharpest possible focus, a most necessary thing in copying reproduction work or testing lenses.

Preliminary

Before saying how this is done I must emphasize the necessity that the plate and the ground glass come exactly into the same position; otherwise, of course, the finest focusing is wasted. It is not safe to assume that any camera is perfect as regards the register of plate and focusing screen. To test, cut a wedge-shaped piece of card (Fig. 10), ruled with fine lines, and laying a stiff straight edge, such as a steel rule, across the focusing screen, slide the wedge between and note the line at which it stops against the straight edge. Repeat the process, laying the straight edge across the loaded plate-holder. The two marks should coincide. The permissible difference depends on the focal aperture of the lens. With *f*/11 or *f*/16, a difference of one or two divisions would not affect sharp focusing, whereas with *f*/4 or *f*/6, the result would be disastrous.

Fig. 10



The Focusing Screen

The medium on which we focus has usually to be sufficiently transparent to allow us to see the image on one side from the other and sufficiently opaque to obstruct some of the rays. For very fine focusing even the finest ground glass or celluloid is too coarse. Better is glass obscured with hydrofluoric acid as prepared by Klimsch & Co., Frankfort-on-Main; or glass coated with an emulsion of gelatine and barium sulphate. However, for the very finest focusing perfectly transparent glass bearing one or two fine sharp lines is the best.

The Aërial Image

When operating thus we focus the aërial image and, for the purpose explained below, some sharp object which we know to be in the plane which the plate will subsequently occupy. The aërial image? says one. The lens forms the image, whether we see it or not. Take any magnifying glass and turning back the focusing screen move the glass towards the camera front, keeping your eye behind it, and you will find that at one point you will see the image plainly. To focus sharply is not enough, because the eye can accommodate itself to see, as sharp, images which are not in the focal plane. Therefore we have our black lines on the screen and use the magnifying lens or focusing glass so that we keep these lines in view while focusing. Both must be sharp at the same time. In practice, lines are scratched on the glass with a diamond or two or three hairs cemented to the glass with Canada balsam.

The Focusing Glass

For almost all work where this method of focusing is necessary, such as interiors or copying, an ordinary good focusing glass (sometimes known as a Ramsden eyepiece) meets all requirements. But in certain critical lists of lenses, an achromatic or anastigmatic focusing eyepiece is essential. Probably that of Zeiss, costing $6 to $12, is the best for this purpose. Other methods of fine focusing have been given in earlier issues of this magazine.

Focusing by Scale

The graduation of scale familiar to every hand-camera user can be figured out by conjugate foci rules, but that is a long and roundabout method. The best plan is simply to set up objects at the distances to be marked on the scale and determine the various points by actual trial. In the case of the many lenses now procurable with a focusing mount, the only necessary operation is to adjust the front or back of the camera in the position to infinity, i. e., by getting the lens to infinity and focusing with the camera rack and pinion on an object at a distance equal to 50 or 100 times the focal length of the lens.

Lens and Camera The proper position of the lens in relation to the plate is with its center opposite the center of the plate and with the board which supports the lens parallel with the plate. Unfortunately this condition is not always possible. Our subject is not high enough up on the plate, and we raise the camera front. With some lens we thereby endanger the covering of the lower part of the plate. The lens does not possess the necessary reserve of field. This is the case with the old wide-angle lens of pre-Jena days. With modern anastigmats of the focal length usually used on a given plate there is reserve covering power more than enough to exhaust the rise of front possible with most cameras.

Then, again, if we tilt the camera to get in some high building we must adjust the back of the camera so that the plate, viewed edgewise, is vertical. When otherwise, lines which should be parallel will appear to converge. When we do this our plate is no longer at right angles to the axis of the lens and we must stop down to get the various parts in focus. With some cameras, however, we can swing the front into parallelism with the back and then do not need to stop down the small aperture. This is the whole gospel of swing-back, and rising and swing front.

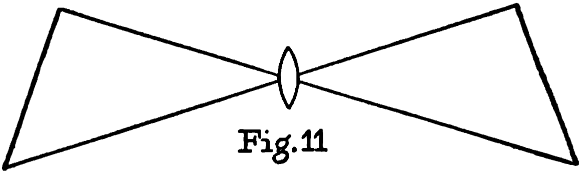


Fig. 11

Remedying Distortion Even when by neglect of these precautions we have obtained photographs with converging distortion we can put matters right by copying the print with plate and original inclined to each other as in Fig. 11, the exact amount of tilt being found by trial.

Clean Lenses Dust, grease and other dirt on the lens is a fruitful cause of fogged or fuzzy pictures. When a lens has one of its surfaces dulled, light is reflected from that surface in many directions instead of in the direction proper to the figuring of the lens. The result is a general fogging or veiling of the plate. The lens of the hand-camera is often placed where it cannot be got at for cleaning, with the result that in time the film of dust which settles on it produces this veil on every plate.

Interior Reflected Light From one point of view a disadvantage of the anastigmats is the large field they cover, i. e., a plate much larger than the plate placed to receive the image. The result is that the inside of the camera is lighted up and light is reflected and re-reflected from the bellows on to the plate, causing a slight general action of light on the plate, with its positive result in flat negatives. The most practical remedy is one or more blackened diaphragms in the camera placed so that the edges of the lens's field falls flat on them and cannot be reflected on to the plate. They are blackened cardboard, each with rectangular opening of the same shape as the plate.

Cleaning Lenses The delicate and highly polished surface of anastigmat lenses is easily spoiled by incautious cleaning. Chamois leather, usually used, is less suitable than a bit of old silk or muslin which has been through the wash many a time.

Lenses should be kept in the dark; some glasses are liable to become yellow in light.

Separating Cemented Lenses Before explaining how to cement and uncement a lens, let me strongly urge the unskilled reader not to attempt the process on a valuable lens.

To uncement, cover the bottom of a saucepan with two or three thicknesses of blotting paper or a piece of felt, pour in some water, place in the lens and gradually heat up over a light. The balsam gradually softens, but the water must usually be the hottest the hand can bear before the separate glasses can be separated by twisting one above the other. All traces of the old balsam are then removed with benzine or turpentine.

In cementing lenses they are placed on the top of a stove or in an oven until thoroughly warm, a little Canada balsam being likewise warmed alongside. Then one drop of balsam (perfectly fluid) is placed in the middle of the concave lens and the convex surface of the other allowed to rest by its own weight. The upper lens is then gently pressed into contact, the superfluous balsam oozing from the edge. The whole is let stand a few further minutes in a warm place, any more balsam which escapes being wiped off with a rag moistened with alcohol and benzine when the lens has become cold and properly set.

Blacking Lens Mounts

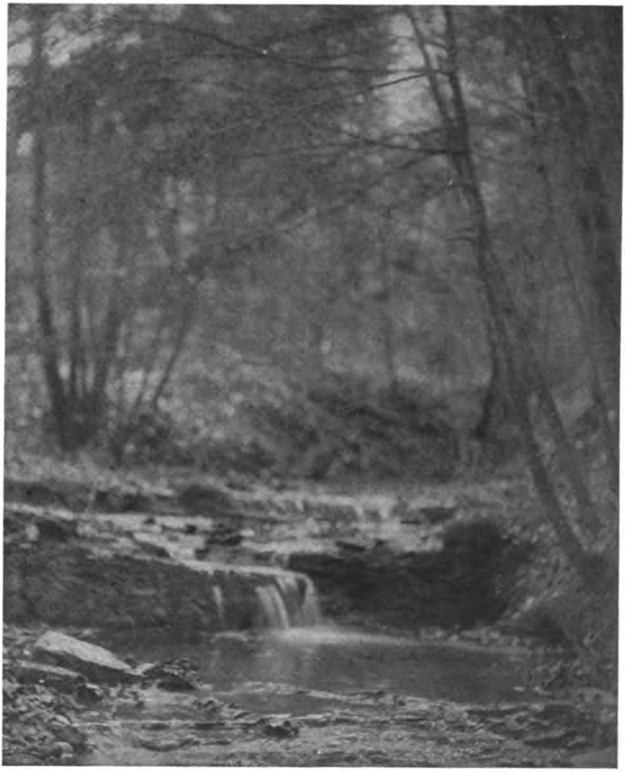
Dead black for lens mounts is better bought than made, but if for home manufacture the following is satisfactory: Make a strong shellac solution in spirits (alcohol); add thereto vegetable black in the finest division, and a little turpentine. Just how much of each constituent can easily be determined by experiment. Too much shellac makes the black glossy; too much turpentine causes it to rub off easily.

Testing Lenses

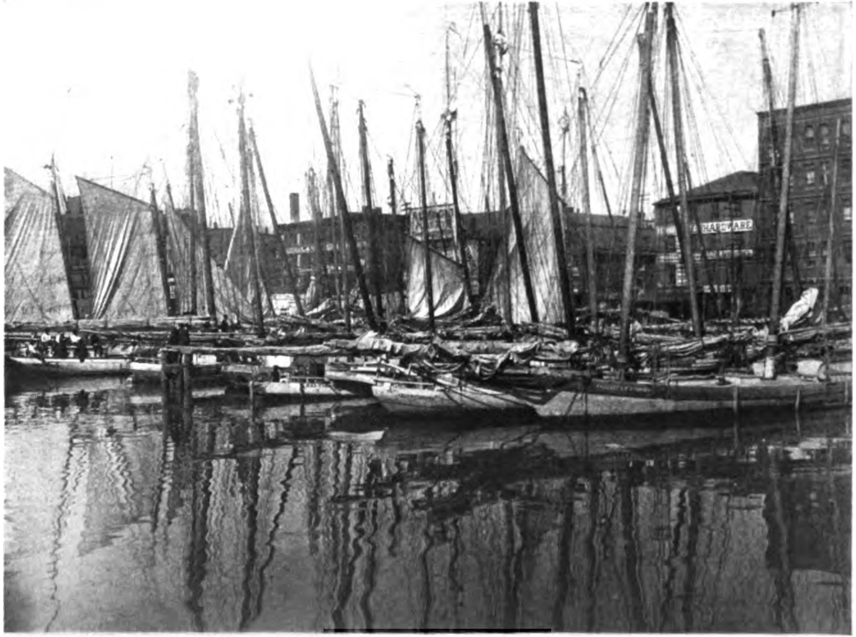
The most useful tests to be applied to a lens are determination of focal length and working aperture, spherical aberration, astigmation, chromatism, and angle of rays permitted by the mounting.

Finding Focal Length

There are many ways of ascertaining this. As stated on page 13 of THE PHOTO-MINIATURE No. 1: "The focal length of a single lens such as is fitted to nine-tenths of the cameras sold under ten dollars is the distance between the lens and the ground-glass when a distant object is focused. In doublet or 'rectilinear' lenses the distance between the diaphragm and ground-glass under the same conditions will be approximately correct." This method would give results very considerably out in the case of almost any of the single combinations of a modern anastigmat, most of which have a "back focus" different from the real or equivalent focus. Some more accurate method should therefore be given. That of Schrœder as modified by Chapman Jones is the best.



AN AUTUMN MORNING
George D. Bartlett, Jr.



THE BALTIMORE OYSTER FLEET
James H. McCorkle

Schrœder-Chapman Jones Method

In Schrœder's original method we focus on a distant object, and then on some line or scale, adjusting things so that image and object are same size. The distance through which the lens must be moved from one position to the other is the focal length of the lens. The advantage of Chapman Jones' method is that so great an extension of camera (twice the focal length of the lens tested) is not required. I give directions in the author's own words (*Camera Obscura*) :

"First, focus sharply a distant object, so distant that it is equivalent to an infinite distance. If it is a thousand focal lengths away, the error in position of the focusing screen will be the one-thousandth of one focal length. Such a fraction will probably be negligible in a 10-inch lens or one of smaller focal length. Mark the position of the movable part of the camera, either back or front, by a fine mark on the baseboard. Next, make two crosses with the fine point of a hard lead-pencil on the focusing screen exactly ten centimeters apart (this is convenient for a half-plate camera), using preferably a machine-ruled paper scale such as is now in common use. Rack out the camera to approximately twice the focal length of the lens, or, if it will not allow of this, as far as convenient. Then sharply focus the scale so that the image of its gradations lie over the two marks already made, and read off on the focusing screen how many divisions of the scale are included between the two marks ; call this *m*. Mark the baseboard as before and measure the distance between the two marks ; call this *f*. If *m* is equal to ten centimeters, *f* is the focal length, as in Schrœder's method. In any case, *f* multiplied by *m* and divided by ten will give the focal length. The ten centimeters is a convenient distance to take for half-plate cameras, but obviously it may be any other known distance. . . . The accuracy of the estimation depends solely on the worker himself, and is simply a matter of good critical focusing and the measurement with a scale from one mark to another. The results of two estimations, at different times, with the same lens, will probably not vary more than the fiftieth of an inch, or even less if the focusing is critically done and the measurements are made with ordinary care and intelligence."

The Nodal Point

By measuring the distance, as found in the preceding paragraph, from the ground-glass when the lens is focused on objects at an immense distance, we get the position of node of emergence of the lens, which can be marked on the lens, and is the point from which distances are set off when the lens is used in, say, an enlarging apparatus. Distances in the other direction from the lens are measured from the node of admission, which can be very easily found by reversing the position of the lens in the above test, i. e., measuring back the distance of the focal length after the lens has been focused with its hood pointing towards the plate.

Spherical Aberration

A lens suffers from spherical aberration when the rays coming through the margin come to a focus nearer than those passing through the center. To test for this a test object is placed some distance away and finely focused, whilst a disc of brown or black paper about two-thirds the diameter of the lens is stuck with a trace of paste to the back glass. Without altering the focus, the disc is replaced by a second one the full size of the lens, but with a circular aperture a little larger than the small disc. The focus should still be sharp.

Astigmatism

Fix up a test object of bold black concentric circles a good way from the camera, say 100 times the focal length, and arrange it so that the image falls on one side of the focusing screen. Focus as sharply as possible, using a magnifier. Where there is astigmatism the whole circle cannot be obtained sharp at once; either a vertical or horizontal section will be sharp, according to the position of the focusing screen. The distance between these two positions indicates the anastigmatic error.

Curvature of Field and Chromatism

How to form a useful idea of these two defects will be gathered from the next paragraph, which gives the test which an 11-inch rapid symmetrical lens should pass, according to Mr. Bolas (*The Lens*, p. 84).

Practical Tests "A leader column of a newspaper is set up on a well-lighted wall, and things are so adjusted as to reduce the column on the ground-glass to half an inch wide. Assuming the glass of the focusing screen to be fine and an eyepiece to be used, the type should be quite easily legible in the middle of the field, the lens not being stopped down. To test for marginal aberrations, let the slip of newspaper leader be extended by joining two pieces so that the half-inch wide image divides the plate lengthwise. The middle being focused sharply, always with the full aperture, it will be found that the lettering at the ends of the plate is out of focus, and to bring the lettering at the ends of the plate into the best focus the back of the camera will generally have to be shifted forward, showing that the field is concave. The racking, owing to the concavity of the field, should never be more than *three-quarters of an inch*. Generally it will be much less. On the column matter near one end make a bold cross with ink, the lines being ½ inch long and ¼ of an inch wide. The image of this cross should come at one end of the plate, one line being parallel to the end and the other at right angles to the end of the plate, and this latter line should point towards the center of the field. First focus one line of the cross and note the shift of the back required to bring the other line of the cross into focus. This shift (call it 'astigmatic difference') should not be more than five-eighths of an inch.

"Such extremes of curvature in the field, on the one hand, and of astigmatic difference on the other hand, should not coexist in the same instrument. The two are to a large extent exchangeable. If there is much astigmatism we may partly exchange it for curvature of field by bringing the two elements of the doublet nearer together. We can lessen the curvature by separating the elements of the doublet; but this will increase the astigmatism.

Test for Achromatism (or Actinism) "This is very necessary, especially as unachromatized symmetricals are sometimes sold. First see that the focusing screen of the camera and the face of the plate in the slide come to the same position. This is best done by focusing a part of a line subject sharply with a rapid lens first on a piece of ground-glass fitted in the plateholder, and then on the focusing screen. If there is a difference, one or the other must be adjusted. Few commercial cameras are in good focal adjustment.

"The long slip of newspaper leader being in position, as in the last-mentioned test (for astigmatism), focus sharply (with full aperture of lens) on a line which comes about half way between the middle and the end of the plate. Expose a plate, and develop. If any line of the printing is sharper than that which was focused, the achromatism or actinism of the lens is faulty. Rapid rectilinears of shorter or longer focal length should define similarly, and the maximum fault allowable from curvature of field and astigmatic difference should be proportional to the focal length, in the ratio given above for an 11-inch lens."

The Pass Test for Anastigmats

Anastigmats are tested in the way described above, but requirements are more exacting with them. Mr. Bolas, in continuation of the test given above, gives the following pass test for an anastigmatic doublet:

"The long column of newspaper leader having been set up as already directed, and to the same standard of reduction it should be possible to find a focal plane in which the whole is distinctly legible at the same time, the full aperture of the lens being used. If the lens has a greater rapidity than *f*/6 a little leniency may be allowed. For the whole-plate lens (about 11 inches focal length) the racking-in for curvature of the field should not exceed one-tenth of an inch, and the astigmatic difference should not be more than one-twentieth of an inch, the test being made as on the margin of a whole plate in the case of a rapid symmetrical. In the case of lenses of longer or shorter focal length proportionate errors may be allowed. The test for achromatism is made as already directed in the case of the symmetrical. The anastigmat should pass the test absolutely, but care must be taken not to misjudge, by reason of want of register between plateholder and focusing frame. A very firm and well-made camera is required for this test."

Angle of Illumination The mounting of the lens interferes with the illumination of the image as one withdraws from the center of the field. To find the area over which the lens allows the full cone of rays to fall, we focus on a very distant object, and replace the focusing screen by a piece of plain glass with a mark denoting the center of the field. Then holding a bit of card with a slit $\frac{1}{16}$ of an inch wide in it against the glass, move it slowly along, watching the shape of the stop. The circular aperture becomes a point when it begins to eclipse. Note the distance of the slit from the center and repeat the experiment on the other side. The sum of the two distances will give us the diameter of the circle, which is the base of the "angle of cone of illumination outside of which aperture begins to be eclipsed."

To get the angle itself, divide this distance by 2, and then by the focal length of the lens. This gives us the numerical value of the tangent of half the angle. Look it up in the table of tangents, and multiply the angle corresponding to it by 2.

"Angle of total illumination" is found in just the same way, only shifting the slit sideways until the diaphragm entirely disappears.

BOOKS

A First Book of the Lens. By C. Welborne Piper. 1901. (English). $1.25.

Contributions to Photographic Optics. By O. Lummer. Translated by Silvanus P. Thompson. 1900. 135 pp. Illustrated. The latest treatise on photographic optics, written in that thorough and practical manner characteristic of German opticians. For the advanced students. Cloth, $2.00, *net.*

The Lens. A Practical Guide to the Choice, Use and Testing of Photographic Objectives. By Geo. E. Brown and Thomas Bolas. (English). $1.25. This is to appear in a few weeks.

NOTES

Mr. Frank S. Dobbins, of Philadelphia, whose monograph on *Telephotography* (No. 26: THE PHOTO-MINIATURE Series) gave so much pleasure and satisfaction, sends us the following tables for the calculation of photographic exposures. These give the amateur a welcome "short cut" to the most difficult of photographic problems, and we gladly avail ourselves of the author's permission to publish them.

PHOTOGRAPHIC EXPOSURE TABLES

BY FRANK S. DOBBINS

Using stop No. 4 U. S. (*f*/7' 7.).

RULE. Multiply successively the figures in the first table by those of the second, the result by those of the third, that result by those of the fourth, and then the whole by the fifth.

TABLE I.—*Distances*

Up to 10 feet	1 second.
10 to 30 feet	½ second.
30 to 100 feet	¼ second.
100 to 300 feet	⅛ second.
300 feet to mile	1/16 second.
Longer distances	1/50 second.

TABLE II.—*Month and Hour*

A. M.	6	7	8	9
P. M.	6	5	4	3
April to August	4	2	1½	1
March and September	6	4	3	1½
October to February			4	2

TABLE III.—*Character of Object*

Sky, clouds, snow, etc.	¼
Landscapes, trees, buildings	1
Dark objects, or where shadows are deep	2

TABLE IV.—*Character of Light*

Intensely bright	⅛
Rather bright light	½
Faint shadows, slightly dim	1½
Dull	2
Very gloomy	4

TABLE V.—*Speed of Plate*

The numbers in left-hand column are for Wynne's Exposure Meter.

128.	Cram. Crown Lovell Ex. Rapid Seed's 27, Stanley 50	1
111.	Cram. Inst. Iso. & Ban., Hammer Ex. Fast, Seed's Non-H. and 26, Orthonon, and N. Y.	1¼
90.	Films, Cra. Med. Iso	2
78.	Carbutt Eclipse, Seed's 23	2½
64.	Cra. Anch	4
32.	Carbutt B 20, 16. Carbutt B 16, 32.	

True moonlight pictures, from ten to sixty minutes.

◆

The organization of the association known as "The Photo-Secessionists," briefly mentioned in our last number, means the turning over of a new leaf in the record of pictorial photography in America. Since the leaf was turned the question has been asked, "What is the Photo-Secession?" This the "Photo-Secessionists" themselves can answer best. To the question "Who are the Photo-Secessionists?" we can only suggest for answer a glance over the names of the exhibitors at the "Photo-Secession" show held in New York during March last. Briefly, we may suppose the "Photo-Secessionists" to be those men and women who have rallied around Mr. Alfred Stieglitz as the inspiration, director, spokesman and propagandist of modern American pictorial photography. The names and work of these men and women are too well known to need repetition here. They comprise that bright band of amateurs (and a few professionals) who made *Camera Notes* and the portfolios entitled "American Pictorial Photography" at once the wonder and admiration of the photographic world. Like all mortals, they had and have their faults and weaknesses, especially in the turmoil of argument and controversy. Their published works will stand as an enduring monument of their strength, their vitality, their originality and daring in an art-craft hidebound by convention and tradition. Wherefore, with all due respect to the rest of the world, we greet the "Photo-Secessionists." Health and benediction! May they abound in good works and grace, having charity toward all men, and malice toward none.

❧

Of the portfolios entitled "American Pictorial Photography" mentioned above, there were two separate series, known as Series I and Series II. Only 150 copies of each series were published, and they cannot be duplicated. The few sets remaining unsold have been acquired by Tennant & Ward, 287 Fourth avenue, New York, from whom the curious can obtain a descriptive announcement on request. The series were published by subscription. Of Series I only 15 portfolios are to be had; of Series II only 42 copies.

Writing about these portfolios in the *Amateur Photographer* (London) a few weeks ago, Mr. A. Horsley Hinton said:

"We can recall no publication which has found its way to our table, either as a present or for review, which seems to deserve our praise and thanks more than the two beautiful portfolios which arrived last week from Mr. Alfred Stieglitz, as chairman of the Publication Committee for the New York Camera Club.

"Each consists of eighteen exquisite prints in a green cloth cover, the collection apparently constituting the first two numbers of a series, entitled American Pictorial Photography, the number printed being limited to one hundred and fifty copies, and, presumably, only intended for circulation amongst the members of the club. In those cases in which the print has been trimmed and mounted on a tinted sheet, it is not easy to tell whether it is a photo-etched reproduction or a platinum print, so faithfully have the subtle qualities of the original been preserved. The pictures . . . form a monument to Mr. Stieglitz's devoted labor in the interests of pictorial photography, which is unique, not only for its evidence of disinterestedness, but for its actual beauty and genuine value. American pictorial photography is fortunate, indeed, not only for having so able a champion and friend, but also in being so finely represented. On looking through the contents of these portfolios one realizes that American pictorial photography is not after all so much in a groove as has been commonly asserted. . .

"We are particularly glad to have, in these portfolios referred to above, constant reminders that amongst American photographers who are seriously striving to elevate the aims and character of photography in that country, there are workers as varied in style, motives and ideals as in Great Britain, and in bringing these prints together in a really beautiful manner Mr. Stieglitz has done an immense service to American pictorial photography as well as to those who thereby have a better opportunity of leisurely studying its merit."

◆

For some time past considerable curiosity has prevailed in photographic circles concerning the plans of the Lumière North American Company. This is an important enterprise, organized to manufacture and market in this country and Great Britain the dry plates and other photographic specialties which have made famous the name of Lumière Bros., of Lyons, France.

Burlington, Vermont, was chosen as the location of the American factory, and the contracts for the construction of the plant have just been awarded. The new factory is to be completed by September and will cost, according to press reports, about $100,000. Mr. F. G. White is the resident manager of the concern, with offices at Burlington. The English branch of the Lumière North American Company is now fairly well established in London, and the firm's products have been received with much favor in Great Britain.

❧

The Northwestern Photographer, official journal of the Northwestern Photographers' Association, published at Winona, Minn., is, we believe, the only photographic journal edited and published by professional photographers for professional photographers. The issue before us, February, is Number 2, Volume III, the journal being published quarterly. John A. Gunderson is the editor, with J. R. Snow, Mankato, Minn., as first assistant editor. The paper is largely devoted to association news.

❧

Number 1, Volume I of *Photo-Clippings* is a new monthly magazine published at 50 cents per year at Hannibal, Mo. It is a 12-page journal, issued as the official organ of the Amateur Photographic Society of America, which is apparently a society organized by O. T. Kirtley and F. A. Kirtley, of Hannibal, for the exchange of prints among amateur photographers.

❧

It is said that, after the publication of the forthcoming number of *Camera Notes*, Mr. Alfred Stieglitz will retire from the editorship and management of that interesting and remarkably beautiful quarterly. Thereafter, according to Dame Rumor, *Camera Notes* will be in fact, as well as in name, "the official organ of the New York Camera Club."

We record these apparently well-founded rumors with sincere regret. Under Mr. Stieglitz's direction *Camera Notes* assumed the first place among the world's photographic journals, and in it American pictorial photography had a notable champion as well as a worthy outlet for its opinions and work.

❧

The steadily growing popularity of ozotype printing leads us to reprint, from the *American Amateur Photog-*

rapher for April, the following letter concerning the process:

Ozotypes by Boiling. DEAR SIRS: I am sending herewith three ozotypes, which I think are fair samples of the utility of that process for the amateur who has never more than an hour or two at his disposal at any one time, and therefore has to do his photographic work somewhat on the "installment plan."

In the summer of 1900 my son and self, partners in photographic work, made up several solutions for the making of ozotypes from formulæ and an article in the *American Amateur Photographer* of that year, but just what number and by whom I am unable to say, as I am writing this at my office and have not the volume by me.

We coated some paper with bichromate, made some prints and fixed them in water, then squeegeed the carbon tissue on after bringing them together in the acetic acid and hydrochinone bath. There were a number of prints thus treated—a dozen or more. From some cause or other the process did not develop up according to our standard or satisfaction, and the summer drawing to a close when the young man had to return to college, ozotypes were only dreamed of for the next twelve months.

In August of last summer, while rummaging round in our den, we came across three of the old squeegeed prints of the previous summer, and there being nothing more pressing to do that afternoon, it was suggested that we develop the year-old ozotypes. The gas stove was set going and a large agate ironware kettle was put on and filled with water, which was soon boiling. We began on those ozotypes with moderately warm water, and as we soon found they were stuck "closer than a brother," the temperature of the water was increased, and as they still stuck together with no sign of coming apart, and as we were "just experimenting" and did not care what the result turned out to be, we finally concluded to just put those ozotypes down in the kettle and let them boil along merrily for a while and see if that would not soften things a bit.

After being treated to a generous boiling, they were finally fished out, laid on glass, and the developing process began. A piece of absorbent cotton was used as a mop for the scalding water. There were no mishaps apart from the reddened finger-tips from too injudicious contact with the scalding water. Finally the pictures developed up, and for a year-old product we thought they were fine.

It has occurred to me that this is about as good a practicable endorsement of this process as any one, even Mr. Manly himself, could wish. Of course, I lay no claim that the prints will pass muster as works of art; they are simply good illustrations that this ozotype process, which has so many stations along its route where one can stop off till next day, or week, or month, offers a method of expression which should appeal to the busy amateur who rarely ever has time at one sitting to carry any photographic manipulation to its logical and successful conclusion, of which large army the writer finds himself an unwilling member.

RICHARD HINES, Jr.

[Boiling is rather a severe ordeal through which to put any kind of print, and we reproduce two of those that have stood the test, the "Widow's Home" and "A Misty Morning," the latter of which especially we like as a suggestive picture. For a certain class of broad work ozotype has qualities equaled by no other printing method, although under ordinary circumstances boiling need never be had recourse to, and it is to us more than surprising that it has not been more generally practiced. The reproductions of Mr. Hines' pictures fall far short of representing the rich quality of the prints.—EDS. A. A. P.

❧

Thanks to energetic efforts by a few workers here and in London the Photographic Section of the International Exhibition at Turin has a very satisfactory display of American and British pictorial photography. This is interesting because the exhibition is wholly devoted to modern decorative art.

The Use of the Brush in Gum-bichromate Printing. In a recent issue of the *Amateur Photographer*, "Waverly" gives a practical note on this detail which is worth place here. He says: How may we make gum bichromate serve our purpose in selecting and obliterating for the purposes of poetic and pictorial expression? By the use of individual hand treatment upon the print.

This must be done with the greatest care, and in the hands of a clever worker, many objectionable objects may be eliminated, lights concentrated, and the whole composition pulled together; in fact, a picture may be made out of little but a few lines and patches. But many workers find a difficulty in using the brush upon their prints without spoiling them at the first touch. The film of pigment is so fragile that it will not stand the gentlest abrasion. To overcome this it is a good plan to develop the print face downwards in water until the image is visible, then taking the print carefully from the bath and draining, hang up to dry. The drying should not be too slow, but should take place in a moderately warm room.

Where this has been done, it will be found that the print will stand a good deal of pressure, and on remoistening it and applying the brush, we shall have little difficulty in working in the pigmented surface to any extent we wish. Of successive printings and coatings I have spoken before, and the complex processes of gum bichromate work are so difficult that one should not think of trying them until the simpler printings have been mastered; and, indeed, any amateur taking up gum work will find enough to do to get good results from plain printings without complicating his work unnecessarily.

There is one point of importance in the foregoing process that attention should be drawn to, and that is that during the drying of the half-developed print no strong daylight should be allowed to fall upon it, for very obvious reasons.

◆

The new spring catalogue published by Taprell, Loomis & Co., of Chicago, is a suggestive display of the wealth of fine mounts now offered to photographers. The designs and colorings of the collection seem to have been chosen with great discrimination to combine effectiveness with common sense and appropriateness. A glance over the catalogue offers many profitable ideas of which progressive photographers should avail themselves. A copy of the collection can be had (while the supply lasts) by sending 16 cents to cover the postage to Taprell, Loomis & Co., 420 Dearborn St., Chicago. Eastern readers should note that the New York office of this enterprising firm is now located at 1123 Broadway, New York.

◆

Acetone-sulphite has lately been suggested as a substitute for sodium sulphite. The subjoined account of the new "preservative" from the *Amateur Photographer* will be read with interest.

For years we have been wedded to old tradition with regard to the developer we have used for all general purposes; sulpho-pyro was our first favorite, and it has pleased us so well that it took its place amongst our daily wants and requirements. It has given universal satisfaction, in spite of the several drawbacks of the sodium sulphite which we use to make up our favorite formulæ. As is well known, sodium sulphite is subject to atmospheric influence, both in the solid and in solution, more so, perhaps, in the former than the latter; but the fact remains that it is not so stable a salt as one would desire. It is not easily soluble in a concentrated form, as we have found that oftentimes in making up certain formulæ, the whole quantity of sodium sulphite could not readily be dissolved in the given quantity of water. Potassium metabisulphite is of somewhat different character, and although fairly stable in its solid state, is not so efficient in solution when kept long; but of the preservative we used little in our working.

Some time ago when a new preservative—acetone-sulphite by name—came upon the market, we felt sure that we had secured an advantage over our old servant, sodium-sulphite, and at once proceeded to test its suitability for the purpose of preserving our pyro for developing purposes. This new preservative is sold in two forms—in powder and in solution form. The powder is freely soluble in water, and fifty-per cent solutions are easily made up. Personally, we buy the solution as being more convenient to use. We found that in this form we were required to use two drams, fifty minims in place of every ounce of sulphite of soda, and the same quantity in place of every fifty-three grains of meta-bisulphite of potassium. Thus in making up a ten-per cent solution of pyro we proceed as follows: Pyro, 1 ounce; acetone-sulphite-Bayer, 7 drams; water, to make up 10 ounces. This will form an efficient and well-preserved developer in conjunction with your usual alkali. It does not stain the negative, and even when used to develop bromide paper or P. O. P., it does not stain in any way the paper; not only as a preservative for pyro may it be used, but also for hydroquinone, metol, and for other photographic purposes of a like nature.

If the powder form be used, it is of importance that the acetone-sulphite is quite dissolved first and then added to the developing agent. It will then ensure the solution being stable and capable of being kept any length of time. We have faith in a great future for this acetone-sulphite-Bayer.

❧

The Eastman Kodak Company write: "The readers of THE PHOTO-MINIATURE will, no doubt, be interested in the fact that Mr. Charles I. Berg, Mr. Henry Troth, and Mr. Rudolph Eickemeyer, Jr., have consented to act as judges in the Kodak Progress Competition. As you are aware, these men stand at the forefront of photography, and we feel confident that the best photographers will have perfect confidence in their ability to pass judgment on the pictures submitted."

The jury selected is, perhaps, as able a body as could have been chosen, representing both good technical work and pictorial photography. The prize list is a remarkable one, and the rules for competitors few and simple.

At the recent "Photo Secessionists'" exhibition held at the National Art Club, New York, there were shown fifteen Ozotype prints, several of which were sold at a high figure. This confirms our opinion that Ozotype will become a favorite process with those seeking artistic effects in their work, and in preparing prints for exhibition. For latitude in manipulation, artistic color effects and gradation, Ozotype has all the advantages of the older carbon printing methods, without their disadvantages. Progressive workers will do well to inform themselves of the qualities of Ozotype printing. The American agent for Ozotype materials, George Murphy, 57 East 9th Street, New York, will gladly supply particulars on request.

◆

The introduction of Meyer's Silver Phosphate printing-out paper a year or two ago gave rise to considerable discussion as to its peculiar advantages. This discussion is revived by a paragraph in *Photography* resulting, apparently, from a formula published in a German journal. We quote:

It is some years ago now since silver phosphate was talked about as a sensitizing agent for printing paper, and from the first accounts of it one was led to believe that it would be much more extensively used than has proved to be the case. By adding a solution of sodium orthophosphate to one of silver nitrate, a yellow precipitate is thrown down, which may be separated off by filtration, and dissolved in tartaric acid solution. A jelly is thus formed, which may be applied to paper with a brush or a pad of cotton-wool. The dry paper may be printed to a reddish brown color in sunlight, and toned and fixed or merely fixed. It may, on the other hand, be given a short exposure by day or gaslight, and developed; a great advantage in this case being that no free silver nitrate is present in the paper. A combination of two emulsions—one of silver phosphate, the other of chloro-citrate—is recommended by M. Th. Romanesco, in the *Allgemeine Photographen Zeitung* for this month; the one contains phosphoric and citric acids in the proportion of 2:5, and silver nitrate, 7; in the other emulsion, the phosphate is omitted, and a substitute made with strontium chloride and lithium chloride, each emulsion being made up with collodion. The author advises the phosphate and chloro-citrate emulsions to be mixed in the proportion of one of the phosphate to four of the chloro-citrate; for toning, a borax bath is recommended, though sulphocyanide or phosphate baths both answer the purpose. The precise advantages to be gained by the employment of silver phosphate will not be made clear until the paper has been used to a large extent. There is, however, a tendency to warm tones, but beyond this nothing much would seem to be gained.

❧

Our bright contemporary, *Western Camera Notes*, gives in its May issue a few good examples of photography at night. The frontispiece, "A Winter's Night in Town," by Frank E. Marks, is an unusually effective bit of work and should be seen. There has been a decided increase of interest in this branch of photography since the publication of THE PHOTO-MINIATURE on the subject last November.

❧

The approach of summer days and an abundance of light for difficult subjects gives appropriateness to the following hints on instantaneous work issued by the Thornton-Pickard Shutter manufacturers.

"Successful instantaneous photography is easy and simple if a little care and judgment is used in observing the necessary points that apply to this kind of work. The most essential conditions are: Good light; a rapid plate; a shutter having a high co-efficiency; as full an exposure as the movement of the subject will allow; a suitable lens; slow development with a very dilute developer when the plate is much under-exposed. For instantaneous subjects as long an exposure should be given as the subject will allow. This depends on the rate of motion and the distance from the camera, both of which affect the movement of the image on the plate during the movement of exposure. The exposure required for a moving object may be obtained simply as follows: The distance of the object from the camera, measured in inches, must be divided by the number of yards per hour at which the object is traveling, multiplied by the focus of the lens in inches. The result will be the fraction of a second, which is the longest allowable exposure that does not show movement in the resulting picture. Putting this into a simple formula, we get

$$\left.\begin{array}{c}\text{Exposure}\\ \text{In fractions of a second.}\end{array}\right\} \frac{\text{Distance of object from camera in inches.}}{\text{Yards per hour} \times \text{focus of lens in inches.}}$$

For example: Suppose the object is 50 feet from the camera and the focus of lens 6 inches, while the movement of the object is at the rate of 12 miles per hour, we get

$$\text{Exposure}\ \frac{50\ \text{(feet)} \times 12\ \text{(reduced to inches)}}{12\ \text{(miles)} \times 1{,}760\ \text{(yards in a mile)} \times 6\ \text{(inches focus)}} = \frac{600}{126720} = \frac{1}{211}\ \text{of a second (about)}$$

This does not allow for movement of limbs, etc., which are always more rapid than that of the object itself, and a shorter exposure will be necessary in consequence; on the other hand, if the object is not moving broadside to the camera a longer exposure is allowable. Below is given a table showing the correct exposure that should be given for various moving objects. The table is made out for a distance from the camera 100 times that of the focus of the lens; that is, for a 6-in.-focus lens at 50 ft., a 7-in. at 58 ft., an 8-in. at 67 ft., a 9-in. at 75 ft., or 12-in. at 100 ft.:—

	Towards the camera. Secs.	At right angles to the camera Secs.
Man walking slowly, street scenes	1-15	1-45
Cattle grazing	1-15	1-45
Boating	1-20	1-60
Man walking, children playing, etc.	1-40	1-120
Pony and trap, trotting	1-100	1-300
Cycling, ordinary	1-100	1-300
Man, running a race, and jumping	1-150	1-450
Cycle racing	1-200	1-600
Horse galloping	1-200	1-600

If the object is twice the distance, the length of allowable exposure is doubled, and vice versa."

BOOKS AND PRINTS

The Lady Poverty. A XIIIth Century Allegory. (*Sacrum Commercium Beati Francisci cum Domina Paupertate: A. D. 1227.*) Translated and edited by Montgomery Carmichael. With a bibliographical introduction and a chapter on *The Spiritual Significance of Evangelical Poverty*, by Father Cuthbert, O.S.F.C. xlviii+209, rubricated, with a photogravure frontispiece, 6¼ x 4½: cloth. Price, net $1.75. Tennant & Ward, New York.

Among the readers of THE PHOTO-MINIATURE there are doubtless many who are interested in the treasures of medieval literature. To these *The Lady Poverty* will prove a book of perfect delight, a little volume to which, after the first reading, they will return again and again. It tells, with marvelous simplicity and charm, how St. Francis wooed and won that most difficult of all brides, my Lady Poverty, a romance celebrated by Dante in the XIth canto of the "Paradise." Apart from its beauty, the *Sacrum Commercium* is noteworthy as the first book written about St. Francis of Assisi, being completed within a year after the Saint's death. It has been six times printed, thrice in Latin and thrice in Italian. The volume here noticed is the first English translation and faithfully enshrines the spirit of the original.

⁂

The editor of THE PHOTO-MINIATURE desires to obtain a clean, perfect copy, preferably bound, of *Photography Annual* for 1898. This is needed to complete his personal set of the *Annual*, and he will be very glad to hear from any reader willing to supply the volume. Describe the condition of the book, whether bound or unbound, whether complete, and state price postpaid to the office of this magazine.

⁂

Development. By Alfred Watkins. (No. 1: Dime Series of Photographic Handbooks), 67 pp., illustrated.

3¼ x 5½. Paper covers, 10 cents. The Beacon Company, Chicago; Tennant & Ward, New York.

This brochure, mentioned in THE PHOTO-MINIATURE No. 34, was delayed in publication and is just ready. It gives, from the pen of its author and inventor, an authoritative account of the Watkins system of Time or Factorial Development. This system, by its logic and the certainty of results it offers, is likely to completely displace the prevalent haphazard guesswork in the development of negatives, and the appearance of the brochure is therefore altogether timely. Read and followed side by side with THE PHOTO-MINIATURE No. 34, we believe this little volume offers the best and most profitable imformation available on its subject.

❧

The Photogram for April is an unusually good number considering the wonderful amount of interest invariably awakened by its pages month by month. As the magazine is obtainable on this side, we will simply give the titles of its articles and leave the reader to do the rest. *Contents:* A System of Indoor Portraiture, with illustrations by the author, F. M. Steadman, (Pueblo, Mex.); Plates and Light Filters for Orthochromatic and Tricolor Photography, by Dr. Adolf Miethe; Factors in my Success (with a characteristic protest and portrait), by Frank M. Sutcliffe; MM. Le Bégue, Bergon and Lemoine (an appreciation), by Robert Demachy; Correct Exposure, second article, by "Fotometro;" The Indoor Portraiture Competition; The Camera and its Movements (Hints to Purchasers); What's What—New Methods and Hints; Forthcoming Exhibitions; New Apparatus (illustrated); and Trade Intelligence. (Spon & Chamberlain, New York, 10 cents.)

FINE ARTS LIBRARY
3 2044 039 435 490

JUL 3
NOV 25 '14
CAMBRIDGE PUBLIC LIBRARY.

This book should be returned to the Library on or before the last date stamped below.

A fine of five cents a day is incurred by retaining it beyond the specified time.

Please return promptly.

FA 16.107 (3) 1901-02

Photo-Miniatre

DATE	ISSUED TO

NOT TO LEAVE LIBRARY